

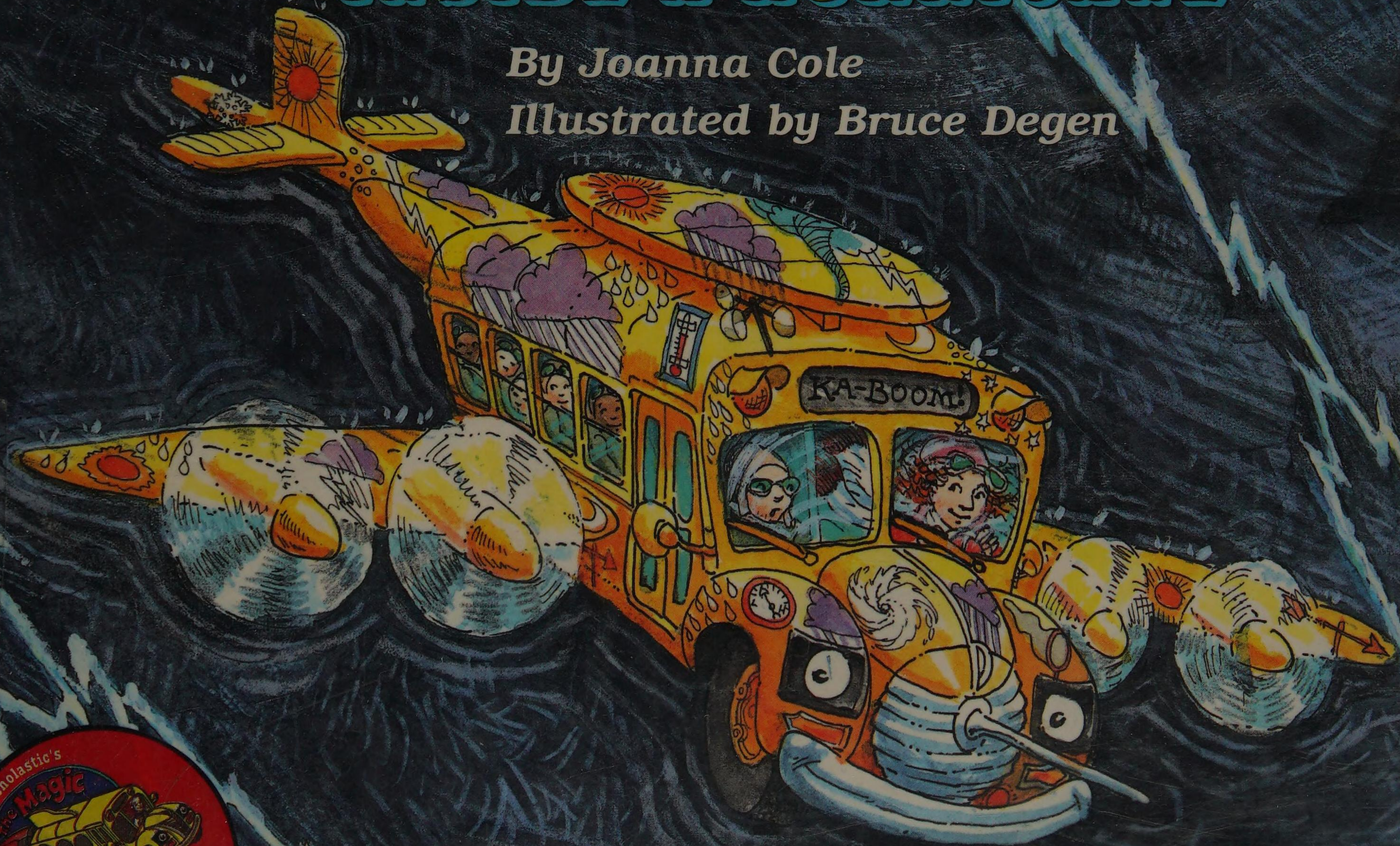


Magic School Bus

INSIDE A HURRICANE

By Joanna Cole

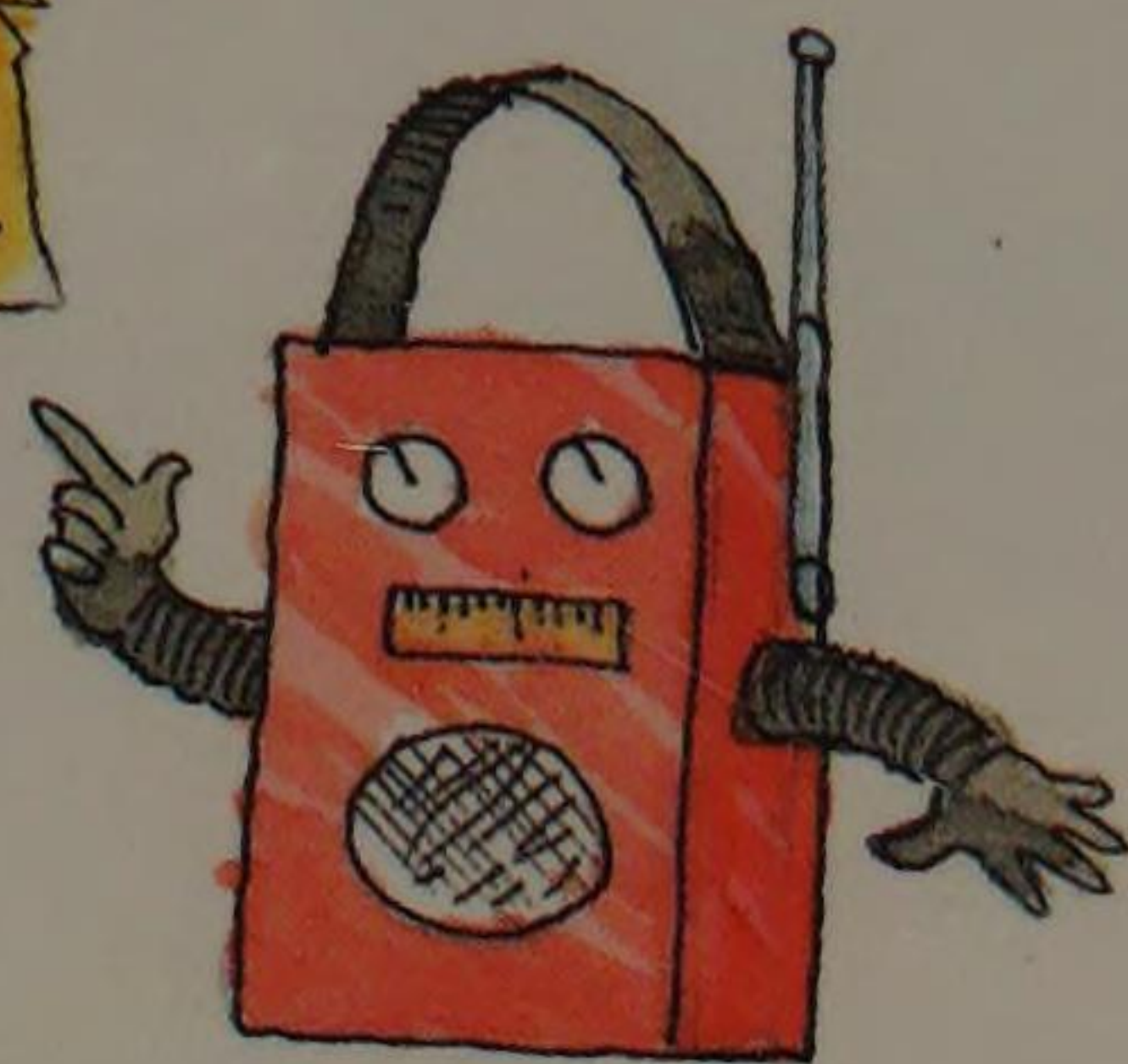
Illustrated by Bruce Degen



\$14.95

Higher in Canada

LOOK FOR A
CHANGE IN THE
WEATHER, FOLKS...



A storm system is brewing over a tropical ocean . . . and a strange yellow object is caught in the whirlwind. It's a balloon. It's a plane. It's the Magic School Bus! And so instead of visiting the weather station, Ms. Frizzle's class experiences a hurricane firsthand, from air, sea, and land.

In the latest addition to this best-selling science series, readers learn how changes in the air make different kinds of weather. Wind, rain, thunder, and lightning will take on new meaning when you're inside a hurricane!

Reinforced binding

Jacket art © 1995 by Bruce Degen





3 1111 01688 7836

DATE DUE

APR 03 2002

SEP 19 2002

MAR 24 2003

FEB 11 2004

NOV 04 2005

JAN 31 2006

MAR 07 2006

APR 14 2006
JUL 19 2006

AUG 23 2006

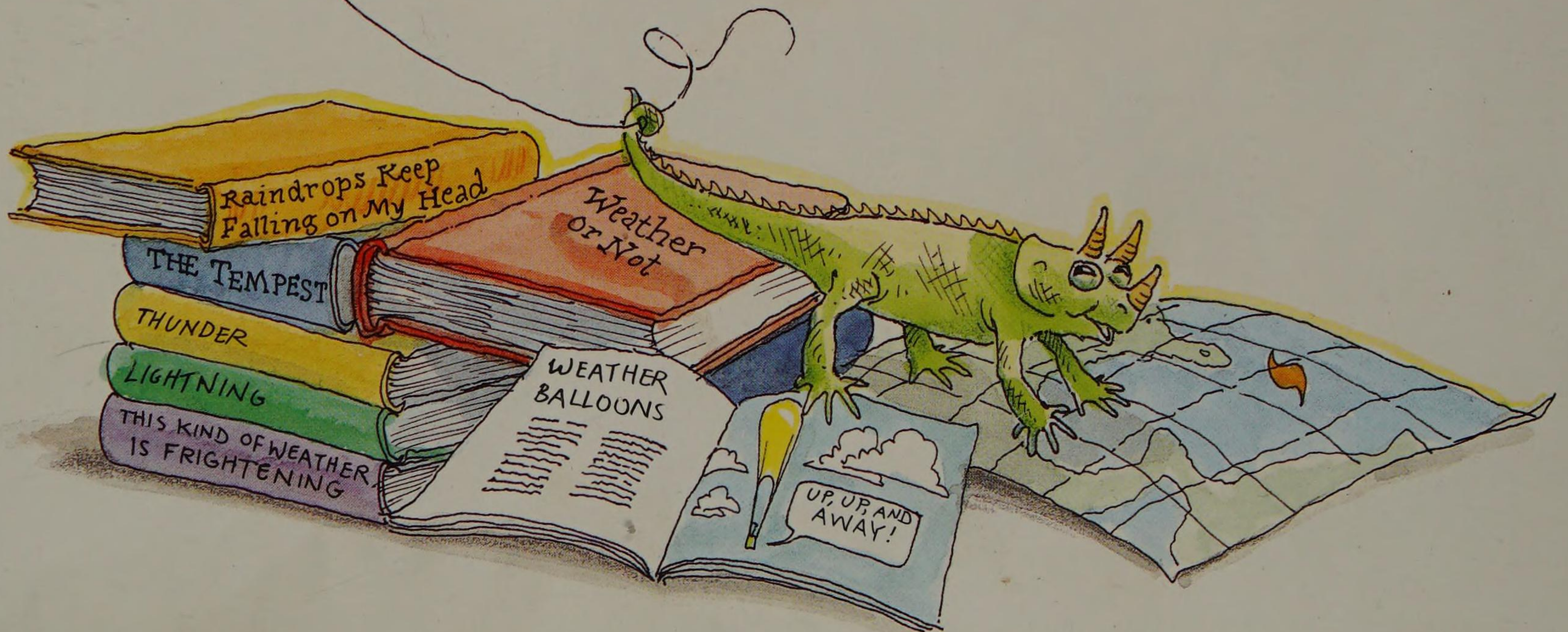
GAYLORD

PRINTED IN U.S.A.

SAN RAFAEL PUBLIC LIBRARY
JUVENILE TITLES
1100 E ST
SAN RAFAEL, CA 94901

The Magic School Bus

Inside a Hurricane







The Magic School Bus ***Inside a Hurricane***

By Joanna Cole
Illustrated by Bruce Degen

San Rafael Public Library
1100 E Street
San Rafael, CA 94901



SCHOLASTIC INC. / New York



*The author and illustrator wish to thank Dr. Robert C. Sheets,
Director of the National Hurricane Center; and Dr. Daniel Leathers, Delaware State Climatologist,
University of Delaware for their assistance in preparing this book.*

Text copyright © 1995 by Joanna Cole
Illustrations copyright © 1995 by Bruce Degen
All rights reserved. Published by Scholastic Inc.
SCHOLASTIC HARDCOVER and THE MAGIC SCHOOL BUS
are registered trademarks of Scholastic Inc.

No part of this publication may be reproduced in whole or in part,
or stored in a retrieval system, or transmitted in any form or
by any means, electronic, mechanical, photocopying, recording,
or otherwise, without written permission of the publisher.

For information regarding permission, write to
Scholastic Inc., 555 Broadway, New York, NY 10012.

Library of Congress Cataloging-in-Publication Data

Cole, Joanna.

The magic school bus inside a hurricane / by Joanna Cole;
illustrated by Bruce Degen.

p. cm.

ISBN 0-590-44686-X

1. Hurricanes — Miscellanea — Juvenile literature. 2. Weather —
Miscellanea — Juvenile literature. 3. Meteorology — Miscellanea —
Juvenile literature. [1. Hurricanes. 2. Weather.
3. Meteorology.] I. Degen, Bruce, ill. II. Title.

QC944.2.C65 1995

551.55'2 — dc20 94-34703

CIP

AC

12 11 10 9 8 7 6 5 4 3 2 1 5 6 7 8 9/9 0/0

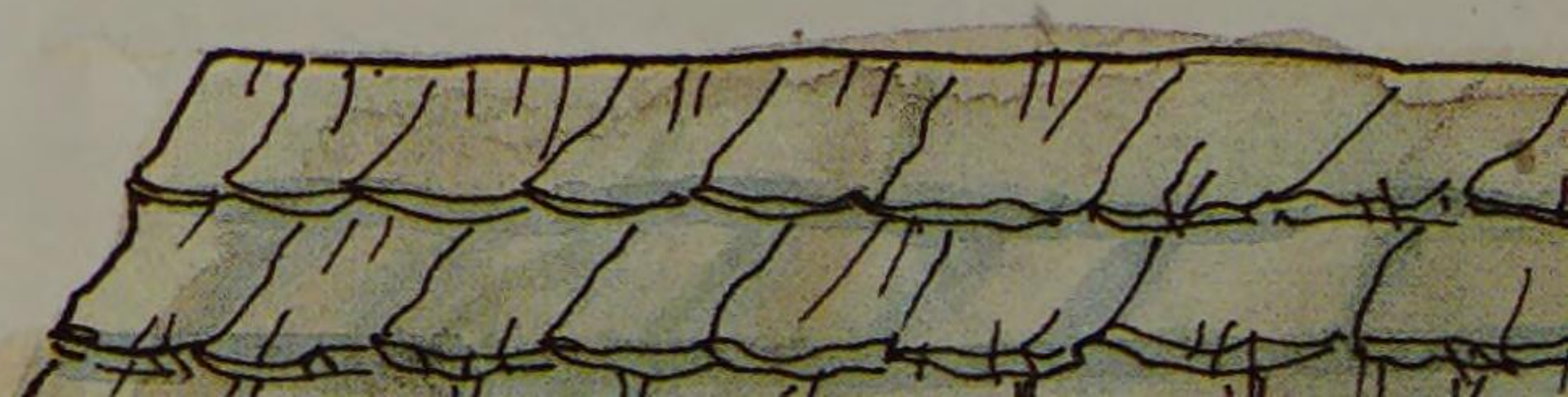
Printed in the U.S.A.

37

First printing, September 1995

The illustrator used pen and ink, watercolor, color pencil,
and gouache for the paintings in this book.

Production supervision by Angela Biola
Designed by Bruce Degen





She's the Magic School Bus Editor
And we'd like herewith to credit her:
To Phoebe Yeh
Our Sunny Day.

J.C. & B.D.

Have you heard about our teacher, Ms. Frizzle?
Her clothes are wild, her school bus is wacky,
and her class trips are weird.
Whenever we study something in her class,
we get into it in a *really* big way.

CLASS, TO UNDERSTAND
WEATHER, WE HAVE TO
KNOW ABOUT THE SUN.

IT'S A HOT TOPIC!

The Sun Heats
Our Earth

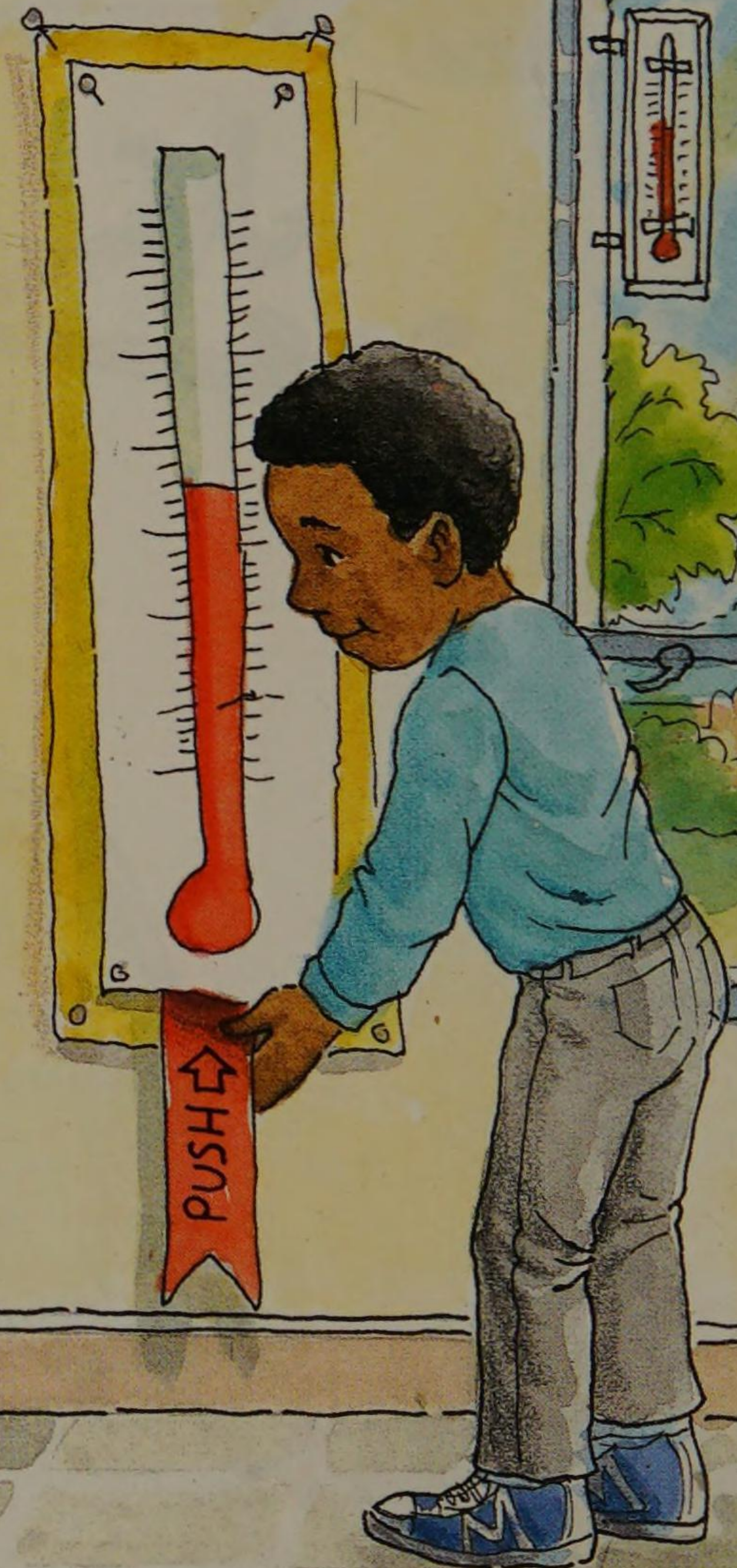


OUR TEMPERATURE RECORD
by Dorothy Ann & Tim

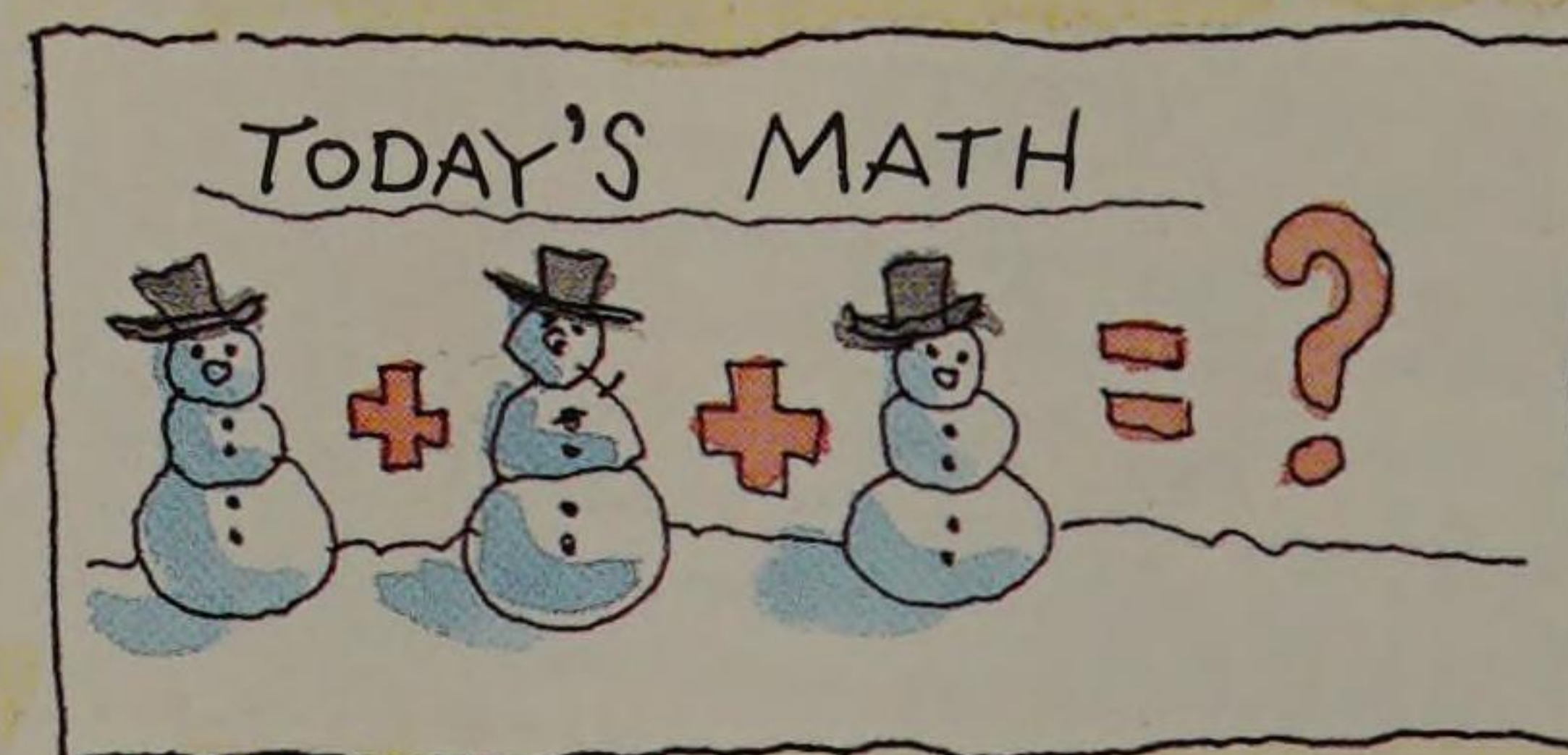
	Morning	Afternoon
MONDAY	65° F	73° F
TUESDAY	71° F	80° F
WEDNESDAY	69° F	76° F
THURSDAY	70° F	75° F

Q: WHY IS THE
TEMPERATURE
USUALLY HIGHER
IN THE AFTERNOON?

A: BECAUSE BY
AFTERNOON, THE SUN
HAS BEEN WARMING
THINGS UP ALL DAY.



We were learning about weather.
Absolutely everything in our room
was about rain or snow or sun or wind.
Every kid in the class
was doing a weather project.
We were even listening to
weather reports on Ms. Frizzle's radio.



SPELLING WORDS

Sun	Wind
rain	Snow
drizzle	sleet
hail	hurricane
don't	forget
your	umbrella



AT MY OLD SCHOOL
WE DIDN'T HAVE
ALL THESE PROJECTS!

AT MY OLD SCHOOL
OUR TEACHER DIDN'T
DRESS THAT WAY.

ANEMOMETER
measures
Wind, Force
and Speed.

AND NOW FOR
THE WEATHER...

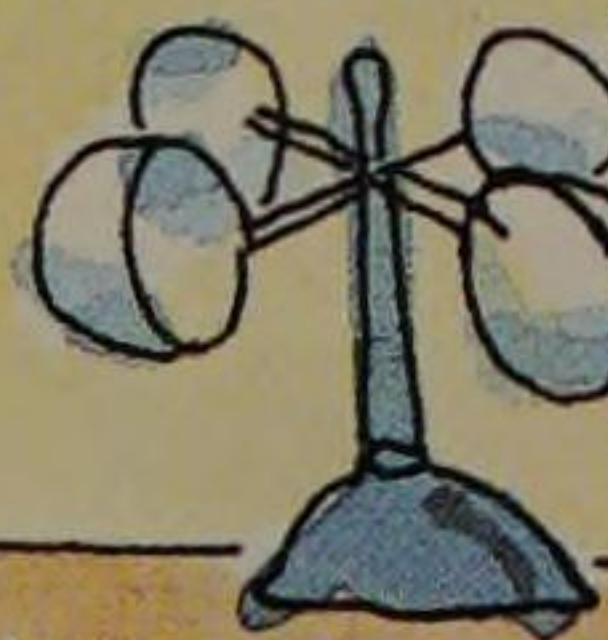
Our Snowflakes
by Michael and Keesha



WEATHER
FORECASTING
MADE EASY



Wind Sock



ADVENTURES OF
WEATHERMAN
WEATHERMAN FACES
THE STORM
WEATHERMAN
MEETS SNOWMAN

THE EARTH IS WRAPPED
IN A BLANKET OF AIR
by Tim

EARTH

ATMOSPHERE

Our atmosphere is a
blanket of air hundreds
of miles thick.

Most of our weather
happens in the troposphere -
the 8 miles of air that is
closest to earth.

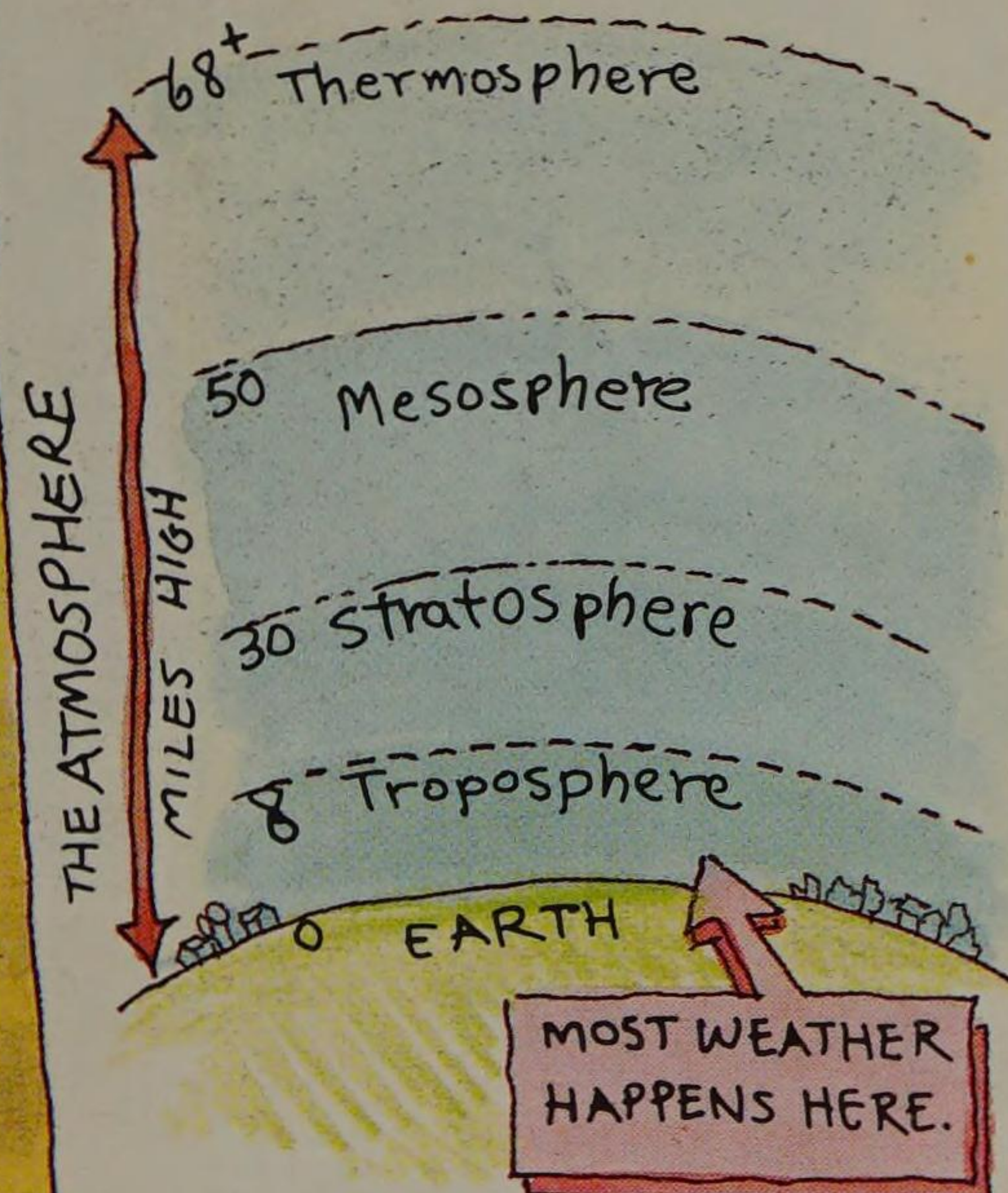
So we weren't surprised one morning
when Ms. Frizzle said,
"It's a perfect day for our trip
to the weather station!"

WE'LL MEET A TEAM OF
WEATHER FORECASTERS.
WE'LL LEARN ABOUT
OUR ATMOSPHERE!

MS. FRIZZLE SAYS WE HAVE TO
KNOW ABOUT AIR TO UNDERSTAND
WEATHER.

AND WE HAVE TO KNOW
ABOUT WATER, TOO.

I CAN'T SEE IT.



AIR IS A MIXTURE
OF INVISIBLE GASES.
by Shirley

AIR HAS WEIGHT.
by Ralphie



A balloon with air
in it is heavier than
an empty balloon.

AIR CONTAINS WATER.
by Wanda



When water evaporates,
water molecules
go into the air.



We hadn't finished our experiments about air, but with Frizzie at the wheel, we were going — ready or not!

SORRY, I CAN'T GO, MS. FRIZZLE. I HAVE TO SHARPEN MY PENCIL.

BUT ARNOLD, MAYBE WE'LL HAVE A REAL ADVENTURE.

IN THAT CASE, I HAVE TO SHARPEN SEVERAL PENCILS.

LOOK FOR A CHANGE IN THE WEATHER, FOLKS.

Q: WHEN DOES THE WEATHER CHANGE?

A: WHEN THE AIR CHANGES
by Shirley

1. Is the air hot or cold?

2. Is it dry or moist?

3. Is it still or moving?

When these things change, the weather changes!

WHAT MAKES WIND?

by Arnold

A mass of heavy air
rolls in and pushes on
a mass of lighter air.

When the air masses
move, that is wind.
Winds range from gentle
breezes to strong gales
that can destroy things.

In no time, we were riding along
in the old school bus.

We were trying to get some music on the radio.
We didn't see Ms. Frizzle turning
a strange little dial on the dashboard.
We didn't notice that the bus was changing.

WIND IS JUST
AIR THAT IS
MOVING, CHILDREN.

LISTENERS, WINDS ARE
PICKING UP SPEED.

THAT RADIO WON'T
PLAY MUSIC.

ALL IT DOES IS
GIVE THE WEATHER.

IT FIGURES.



All of a sudden Dorothy Ann said, "Look!"
We couldn't believe it.
We were all wearing flying suits.
We were sitting in a basket!
The bus had turned into a hot air balloon,
and we were about to lift off!

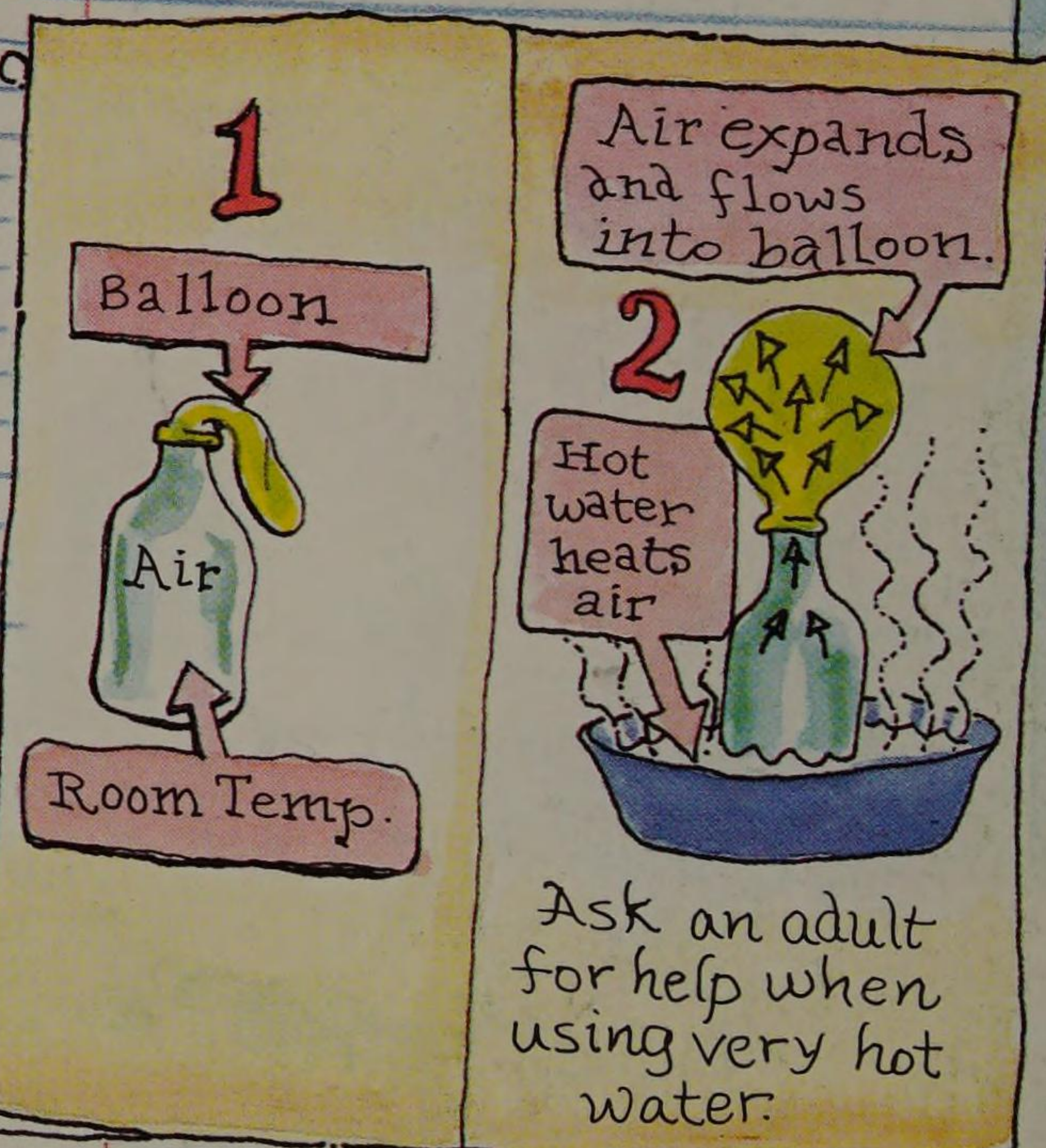
AT MY OLD SCHOOL,
WE NEVER WENT
UP IN HOT AIR
BALLOONS.

SOUNDS LIKE
MY KIND OF
SCHOOL.

WE'LL BE USING
THIS GAS BURNER
TO HEAT THE AIR
IN THE BALLOON.



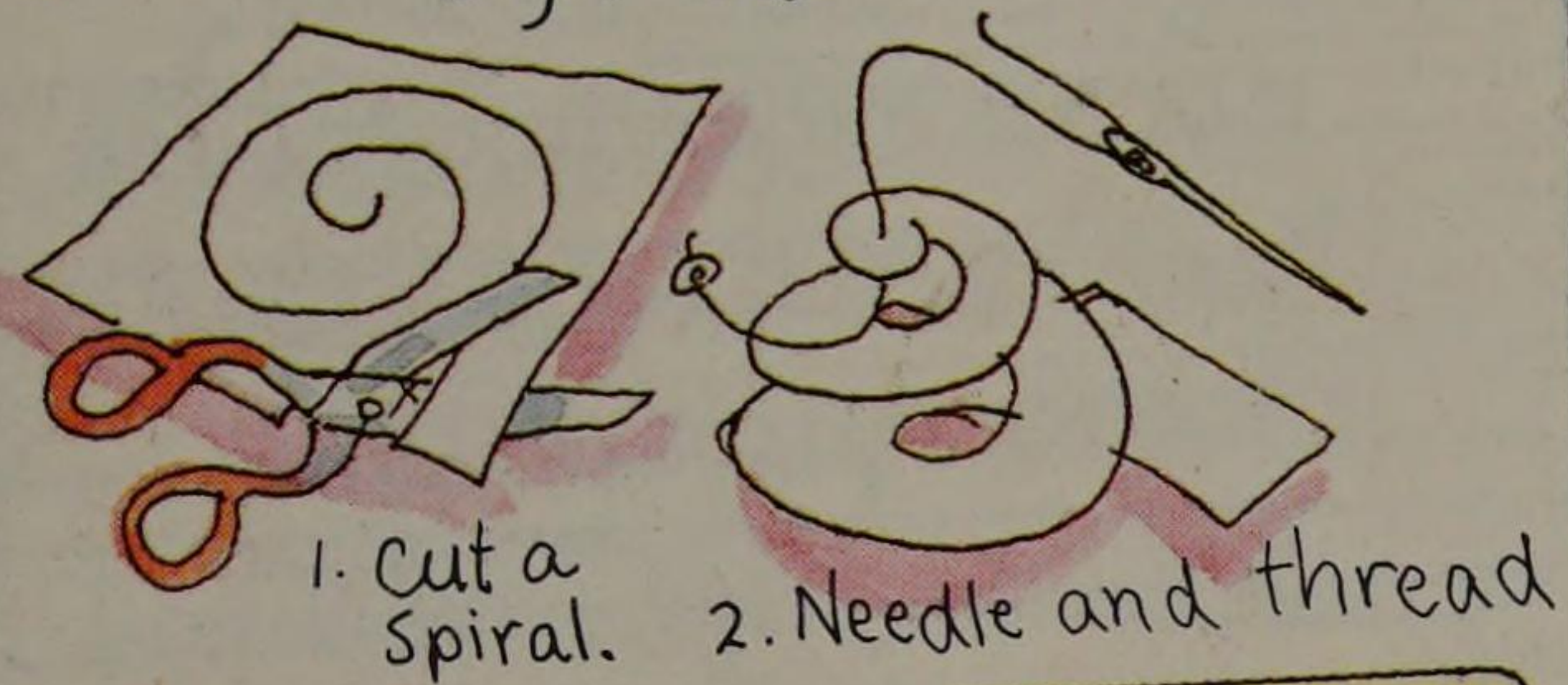
- HEAT MAKES AIR EXPAND
by Molly
Hot air expands because
heat makes air molecules
bounce far apart.



- TWO WORDS FROM
DOROTHY ANN
When something expands,
it spreads out.
Air molecules are the
tiniest bits of air.

SEE HOT AIR RISE

by Alex and Rachel



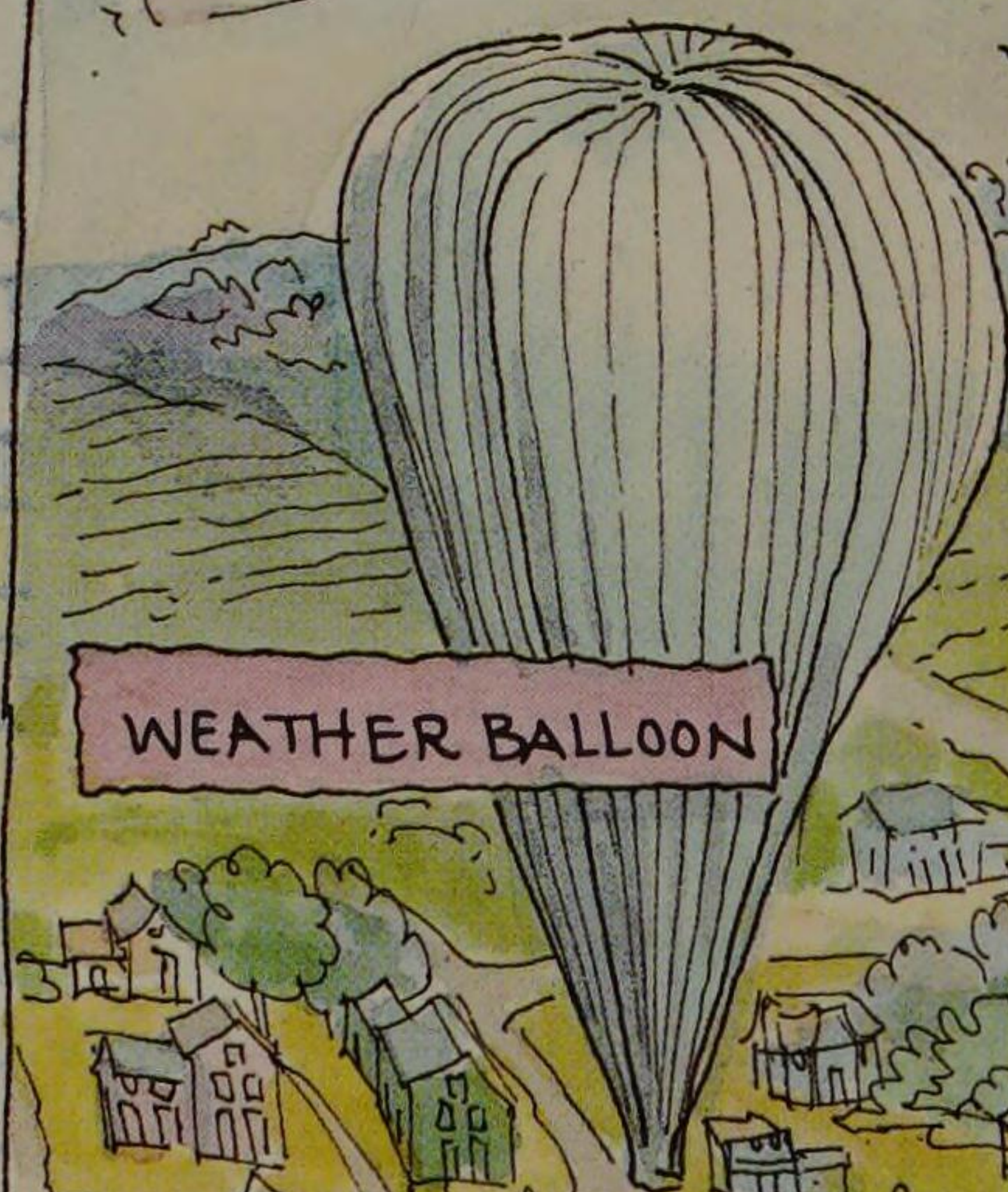
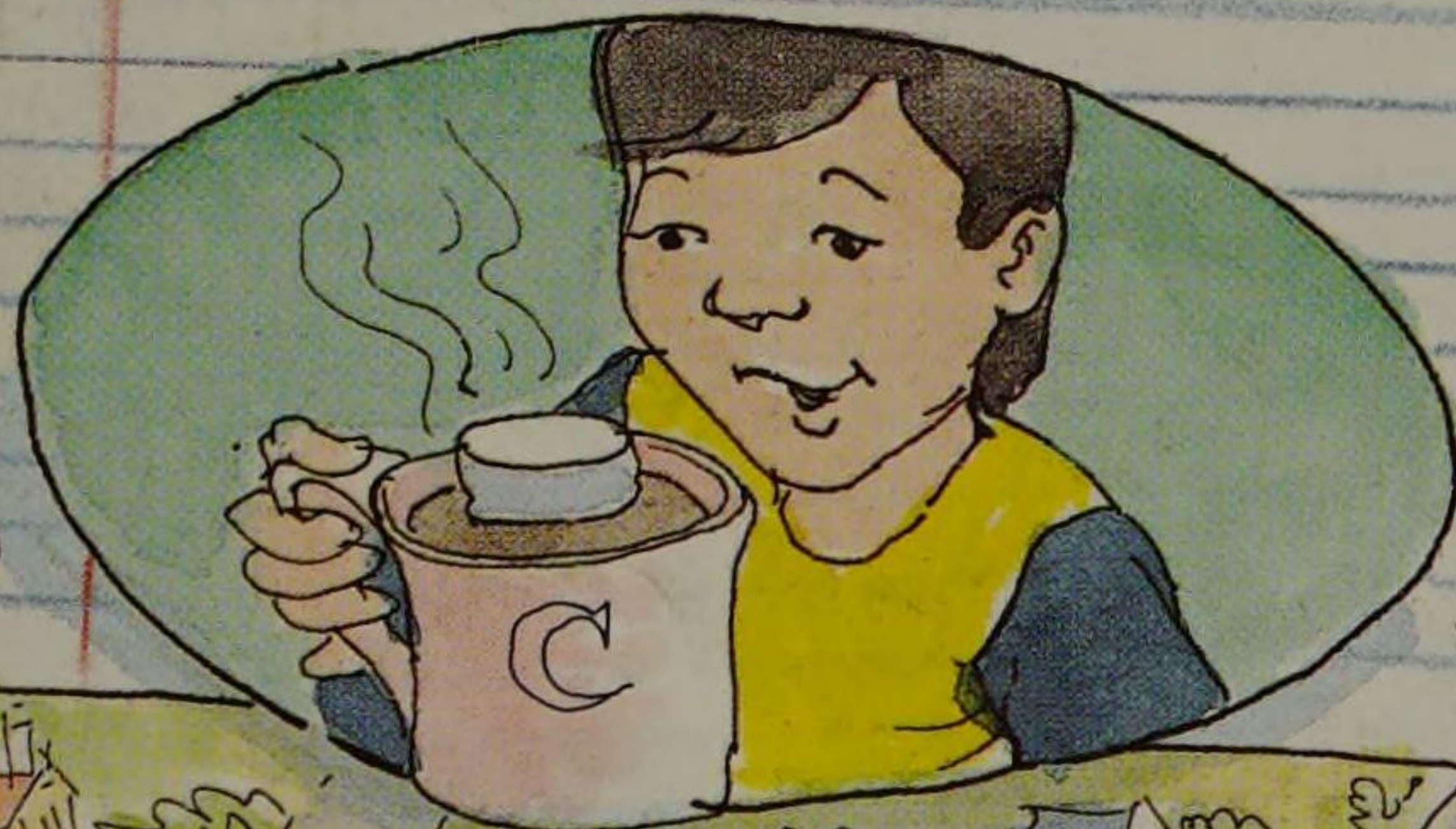
We started going up, and Ms. Frizzle said, "Did I mention, children, that hot air rises?"

CLASS, EVERY DAY ALL OVER THE WORLD, SCIENTISTS SEND UP SPECIAL BALLOONS TO TAKE WEATHER MEASUREMENTS.

WHY DOES HOT AIR RISE?

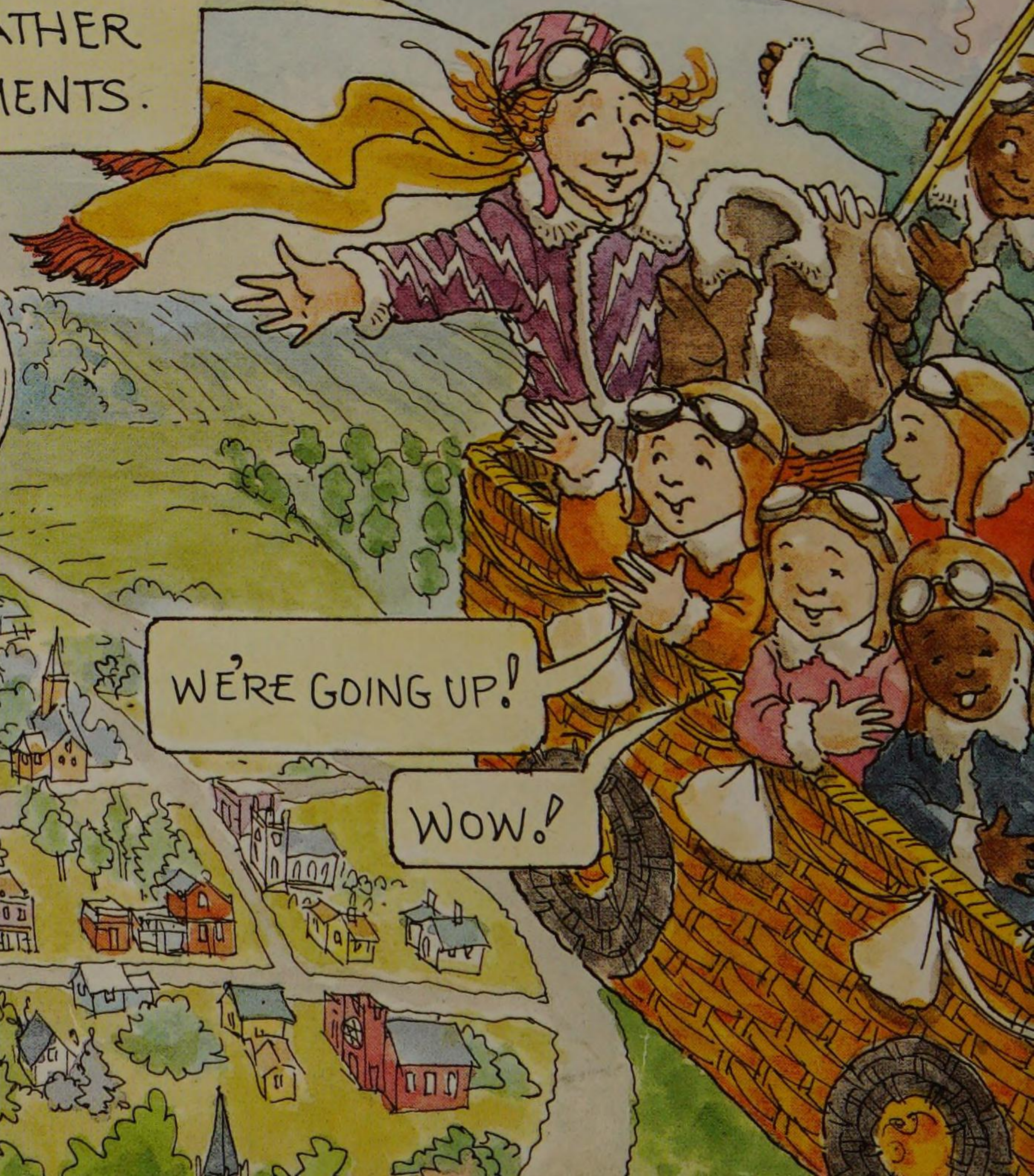
by Carlos

Hot air is lighter than cold air, so it "floats" on top of cold air, the way a marshmallow floats on hot chocolate.



WE'RE GOING UP!

WOW!



We rose higher and higher.
Even though hot air was filling the balloon,
the air around us was growing colder.
We had to put on warm jackets.

IT'S COLD UP HERE!

YOU'RE NOT AFRAID
OF HIGH PLACES,
ARE YOU, ARNOLD?

THAT RADIO SPOKE TO ME!

HOW DID IT KNOW MY
NAME?

I KNEW I SHOULD HAVE
STAYED HOME TODAY.

GOING UP?
BETTER BUNDLE UP!
by Phoebe

BRRR.

Warm air rises
from earth.
As it goes up,
it gets colder.

YOU CAN'T SEE IT,
BUT IT'S ALL
AROUND YOU.
WHAT IS IT?

Riddle
Book

AIR!

A WEATHER WORD

by Dorothy Ann

When water condenses,
molecules of water vapor
join together and make
drops of liquid water.



“Warm air rising from earth carries
lots of water vapor molecules,”

Ms. Frizzle continued.

“As the air rises, it cools down.

The water condenses in the air
and forms clouds.”

DID YOU BRING
YOUR RAINCOAT,
ARNOLD?

TELL ME THIS
ISN'T HAPPENING....



We drifted into the center of a cloud.
Ms. Frizzle was right — it was *damp* in there.
The cloud was made of tiny water droplets
hanging in the air.

THREE KINDS OF CLOUDS by Wanda

1. Curly or wispy clouds
are called cirrus.

2. Layered clouds are called
stratus.

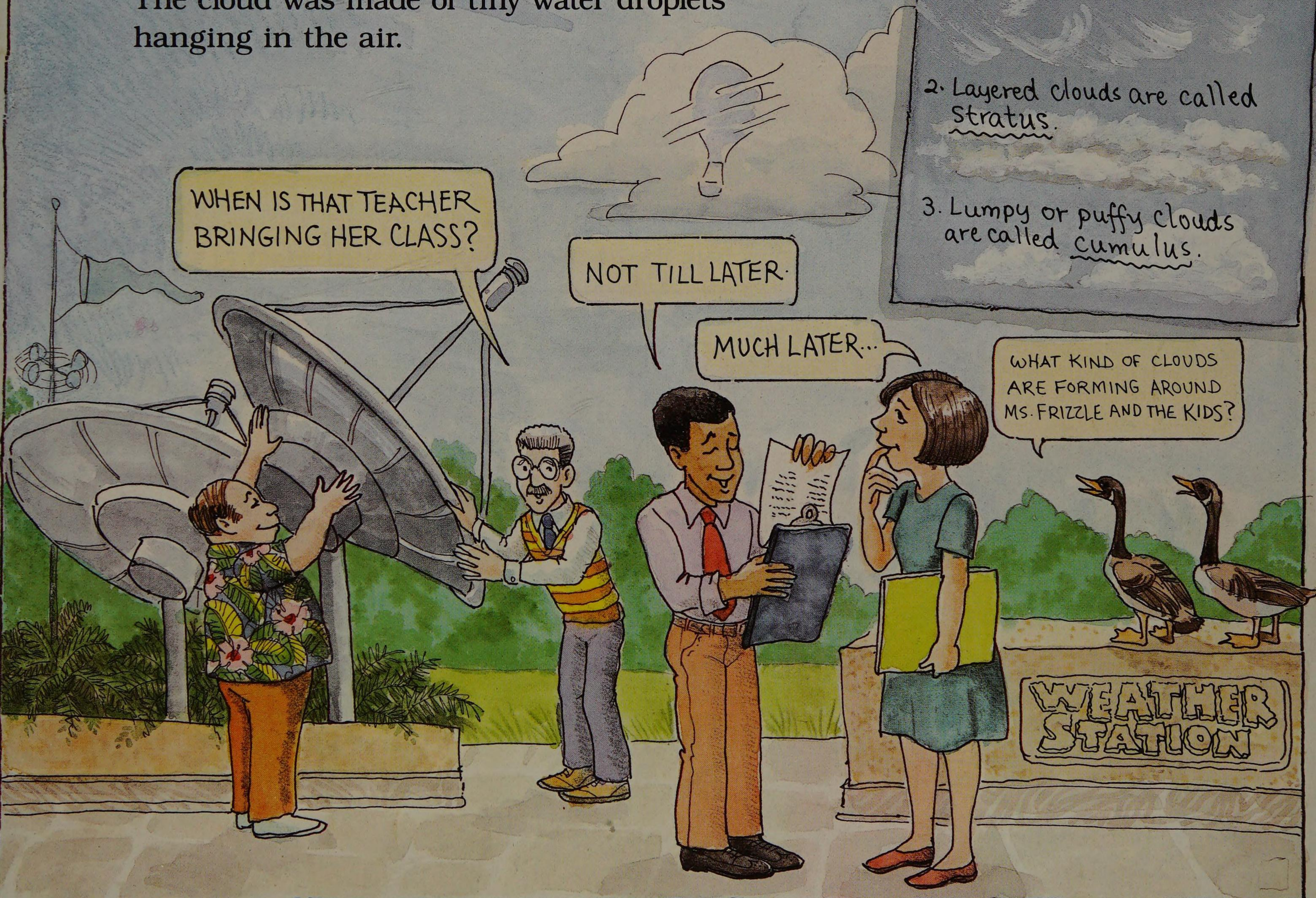
3. Lumpy or puffy clouds
are called cumulus.

WHEN IS THAT TEACHER
BRINGING HER CLASS?

NOT TILL LATER.

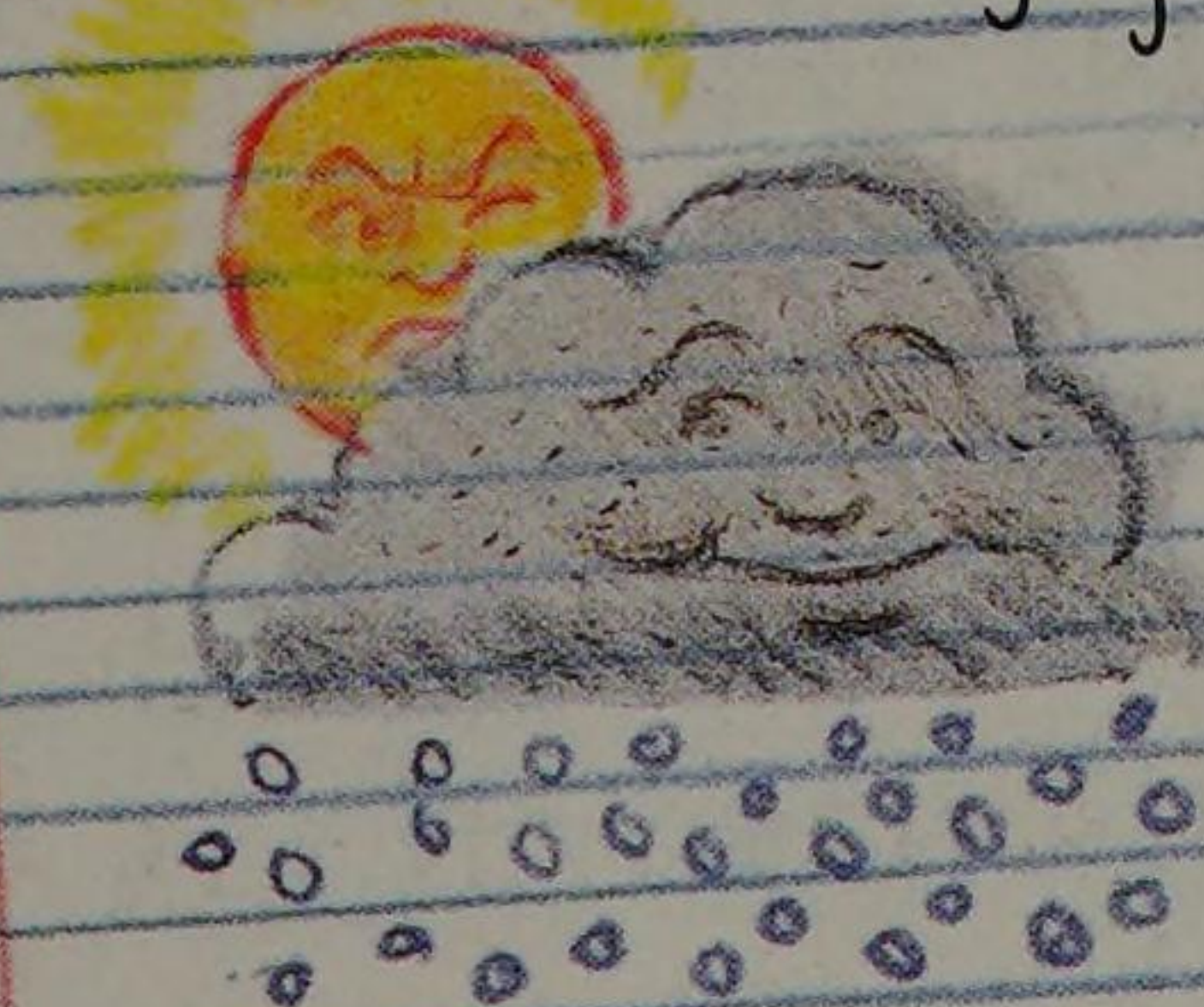
MUCH LATER...

WHAT KIND OF CLOUDS
ARE FORMING AROUND
MS. FRIZZLE AND THE KIDS?



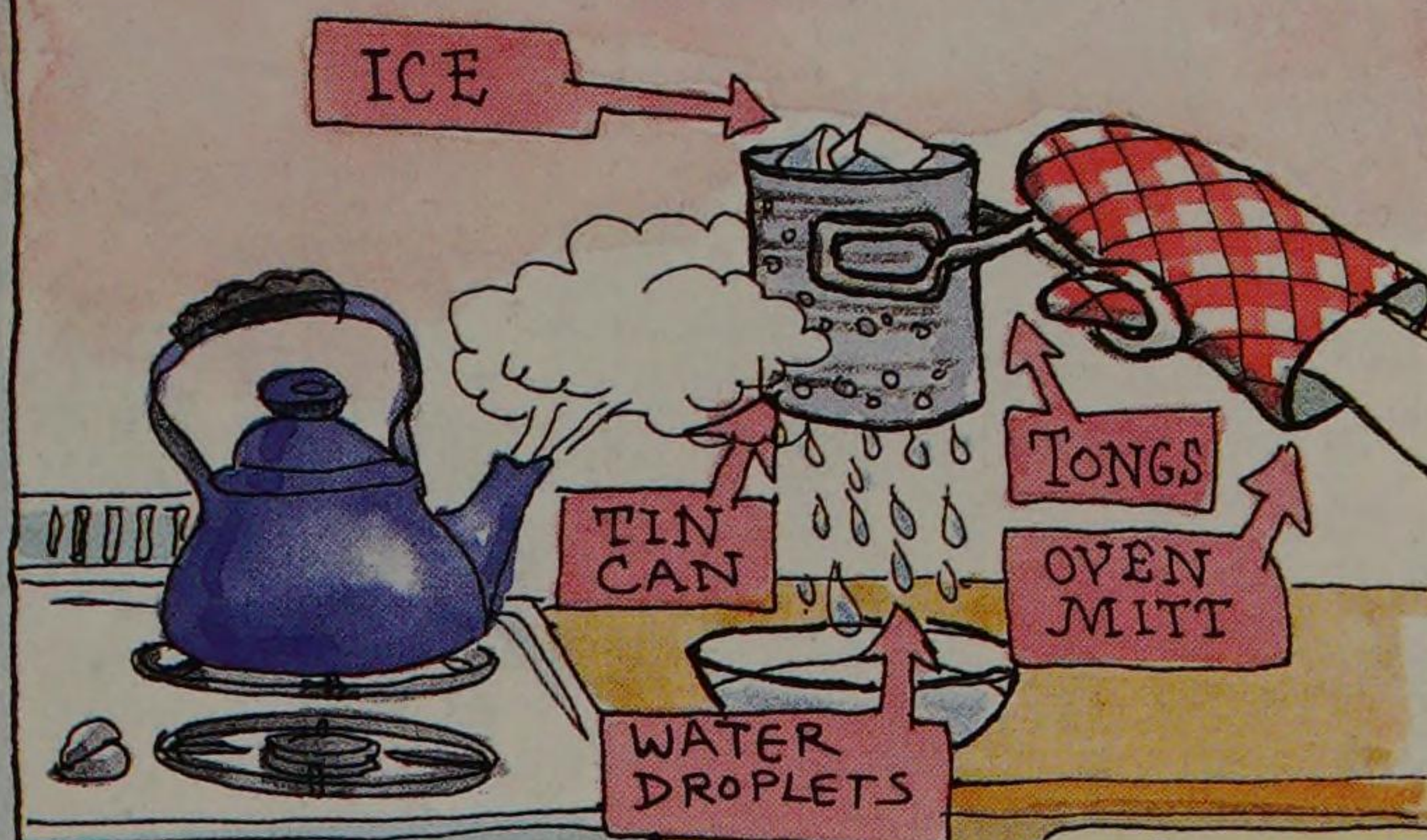
WHAT MAKES RAIN CLOUDS TURN DARK?

by Gregory



Rain clouds have lots of ice crystals and big, heavy raindrops. These block out the sun.

OUR RAINMAKING PROJECT by Amanda Jane and Arnold



WHEN YOU
USE THE STOVE...

... REMEMBER
TO ASK AN
ADULT TO HELP.

Inside the cloud, droplets began coming together. They formed bigger and bigger drops. As the drops became heavier, they started falling.

IT TAKES THOUSANDS
OF DROPLETS TO FORM
JUST ONE RAINDROP.

MOST CLASSES
STAY IN ON
RAINY DAYS.

NOT MS. FRIZZLE'S
CLASS!

Down below, the weather forecasters were standing in the rain.

They didn't see us inside the cloud, but we could hear their voices.

One of them said, "I hope that teacher knows there's a *hurricane watch* in effect."

CHECK OUT MY HURRICANE WATCH, ARNOLD. GET IT? HURRICANE WATCH!!

I'M PRETENDING I CAN'T HEAR....



WHAT IS A HURRICANE?

by Florrie

A hurricane is one of the most violent kinds of storms.

In a hurricane, winds swirl in a circle around the storm's center at 74 miles per hour or more!



MORE WORDS FROM DOROTHY ANN

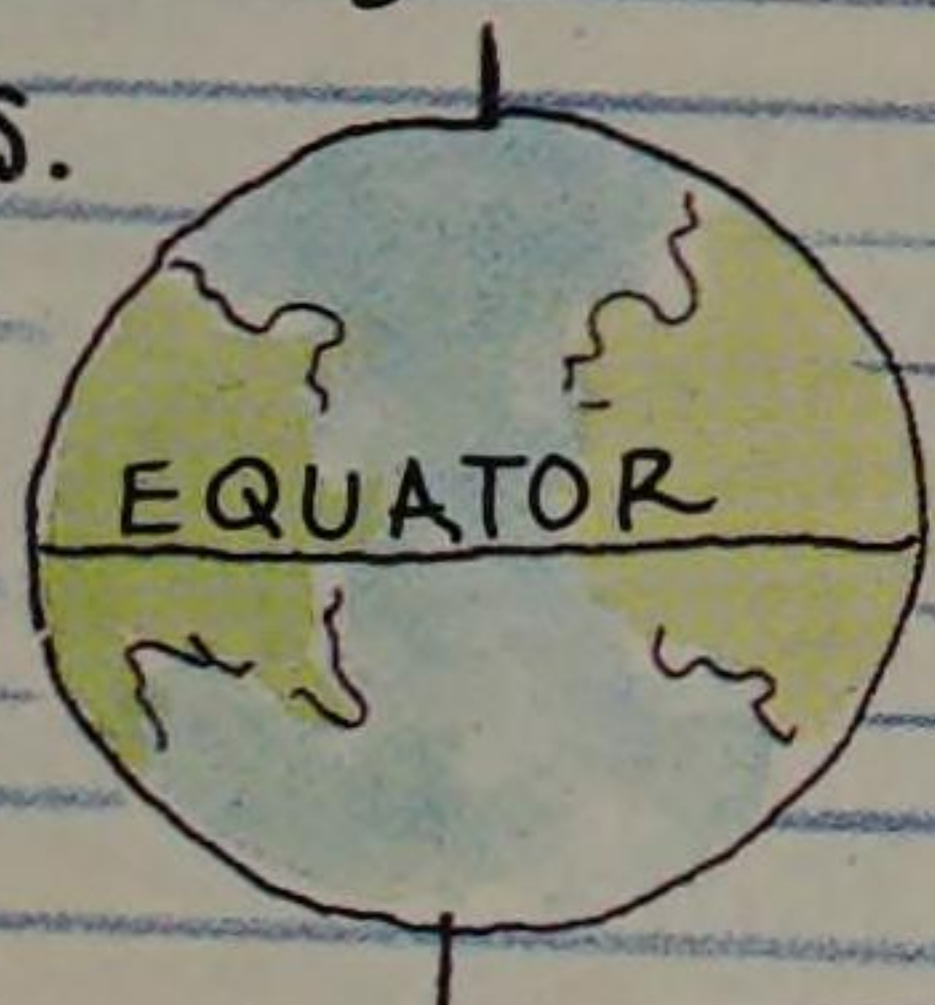
A Hurricane Watch means that a hurricane may strike within the next 36 hours.

A Hurricane Warning means that a hurricane is likely to strike within the next 24 hours.

A warning is more urgent than a watch.

WHAT IS THE EQUATOR? by Carlos

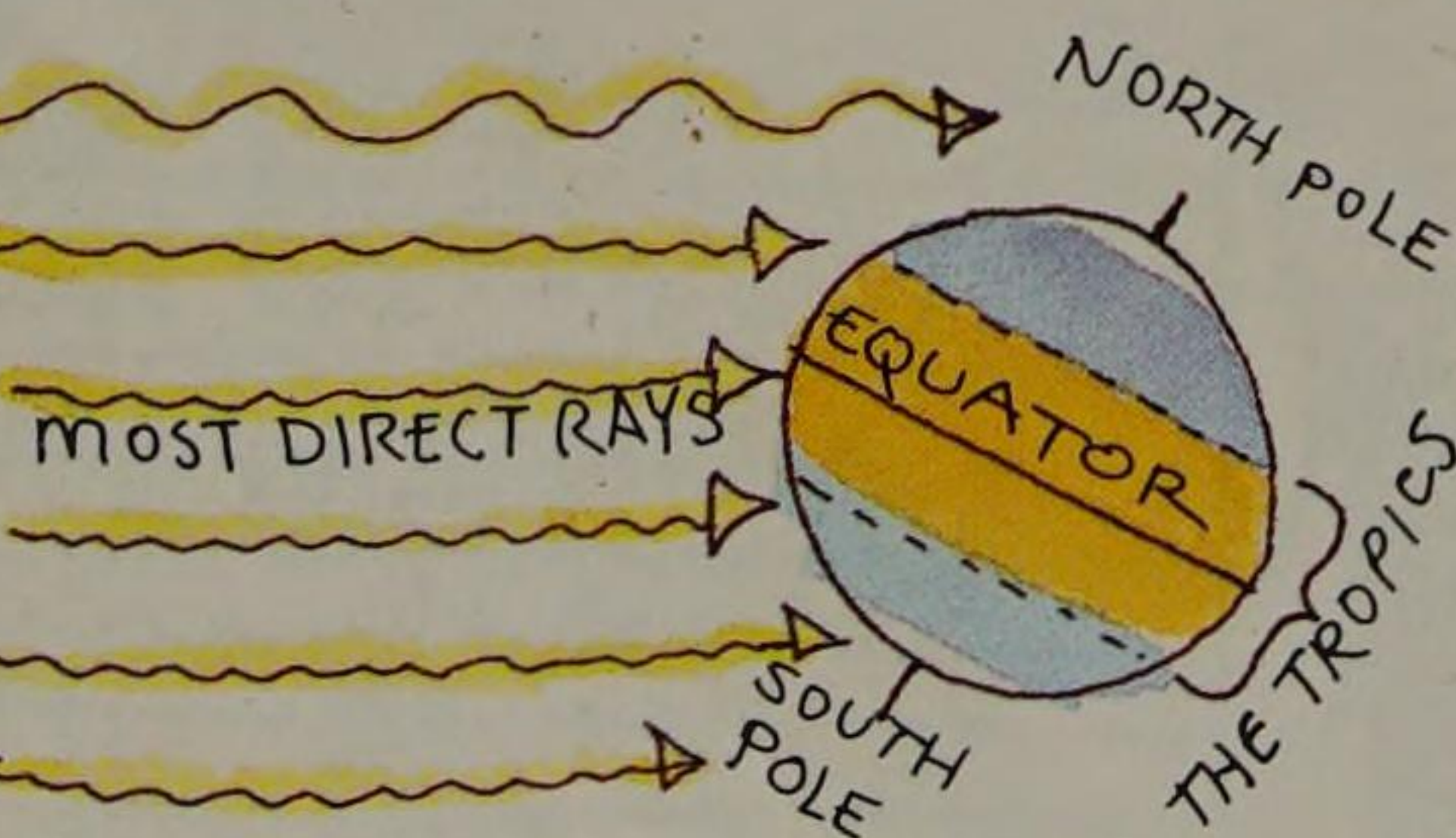
The equator is an imaginary line around the earth's middle. It divides the globe into two equal parts.



WHY IS IT HOTTER NEAR THE EQUATOR? by Michael

Because of the way the earth is tilted, the sun's rays almost always shine toward the earth's middle. This means there are no cold winters there.

SUN



As usual, Ms. Frizzle paid no attention. She turned up the fire, and more hot air rushed into the balloon. As we rose above the cloud, the wind started pushing us south. Before long, we had traveled thousands of miles. Ms. Frizzle said we were above a tropical ocean about five hundred miles north of the equator.

WOW! LOOK AT THAT WATER!

WE CAN GO SWIMMING!

AND WINDSURFING!

AND SNORKELING!



Below us, blue-green waves were sparkling.
On a sandy island, palm trees were waving.
It looked like a vacation paradise to us.
But Frizzie said, "Class, we have now arrived
at one of the world's hurricane breeding grounds!"

NEARLY ALL HURRICANES
GET STARTED OVER WARM
TROPICAL OCEANS, KIDS.

I'VE HEARD THAT
HURRICANES ARE
DANGEROUS.

SO MS. FRIZZLE IS
TAKING US TO ONE.

SHE WOULD!

WHY DO HURRICANES HAVE NAMES?

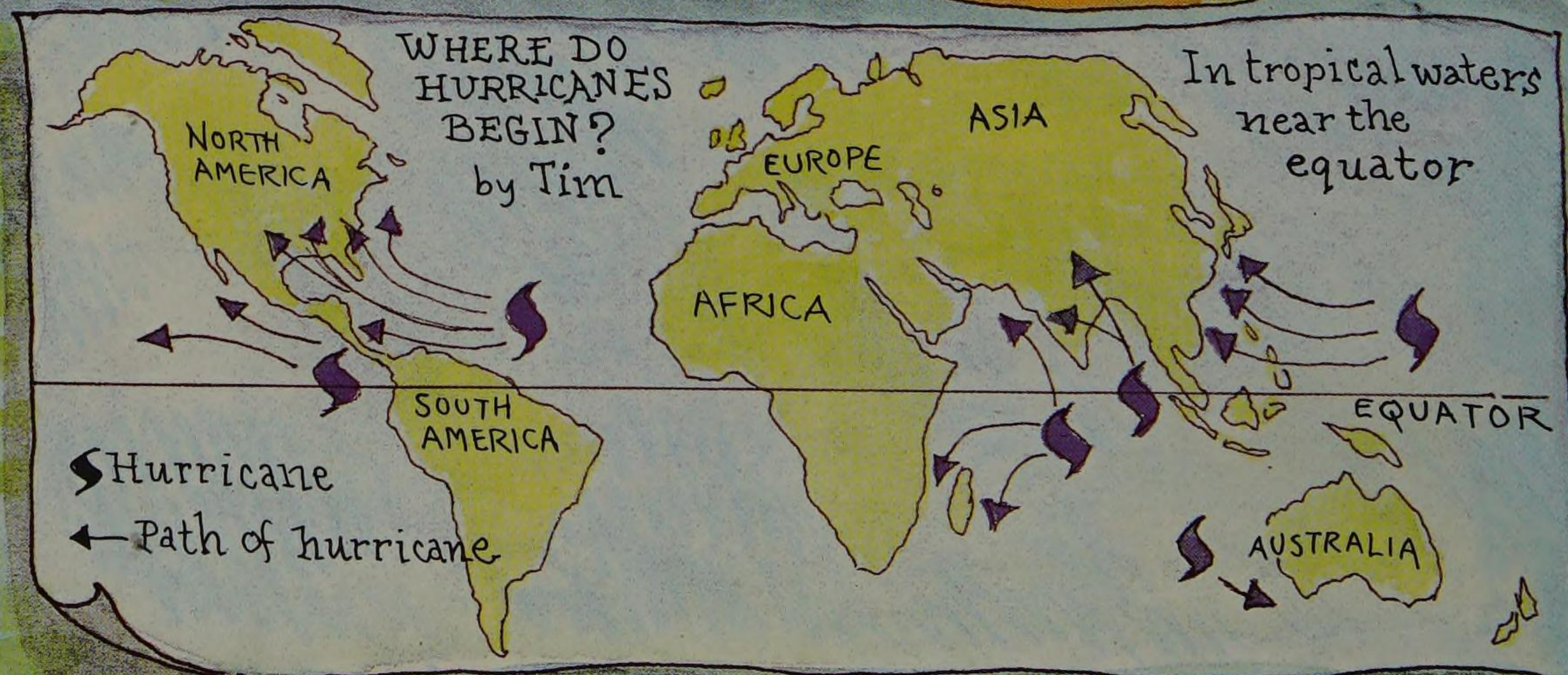
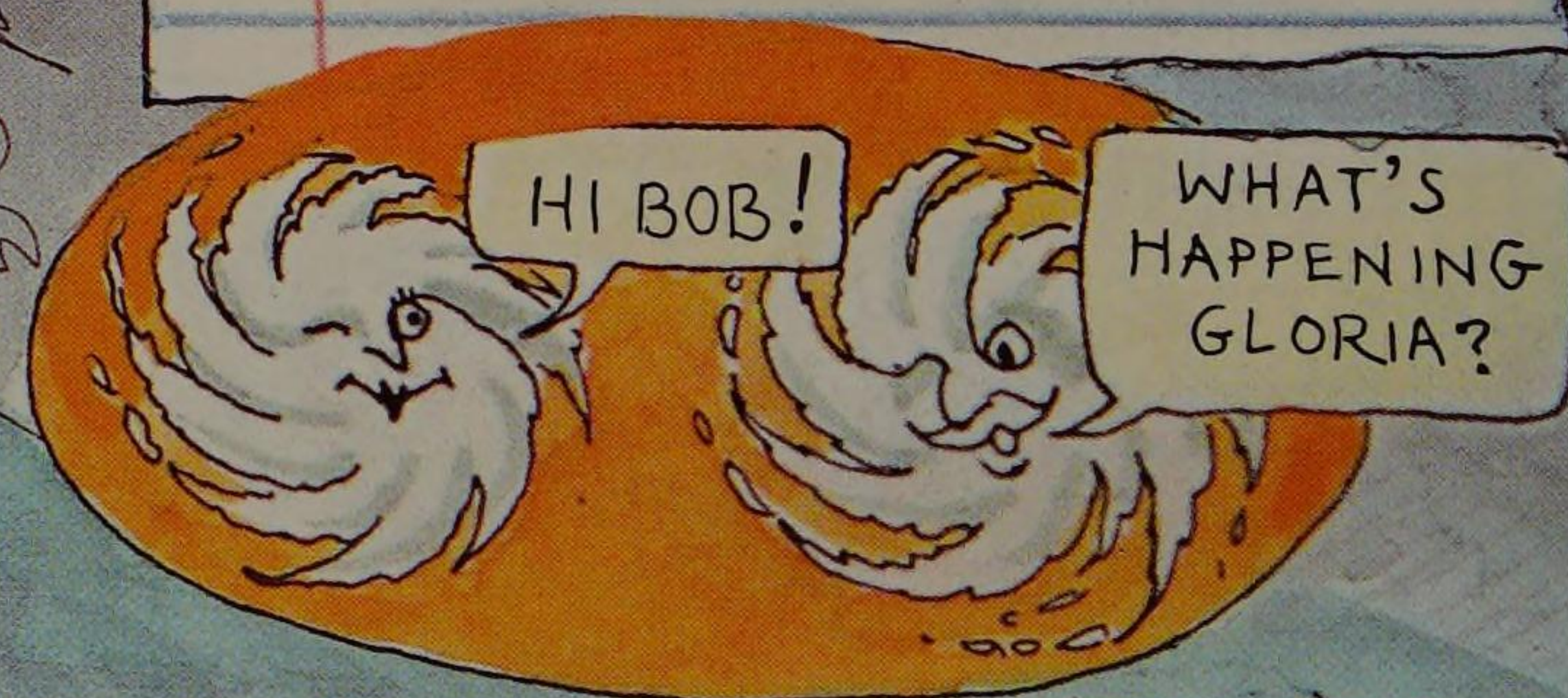
by Carmen

Often, more than one
hurricane is brewing at once.
It's easier to keep track of
them if they are given

names.

Some famous hurricanes:

- Agnes
- Andrew
- Bob
- Elena
- Gilbert
- Gloria
- Hugo



WHEN IS HURRICANE SEASON?

by Rachel

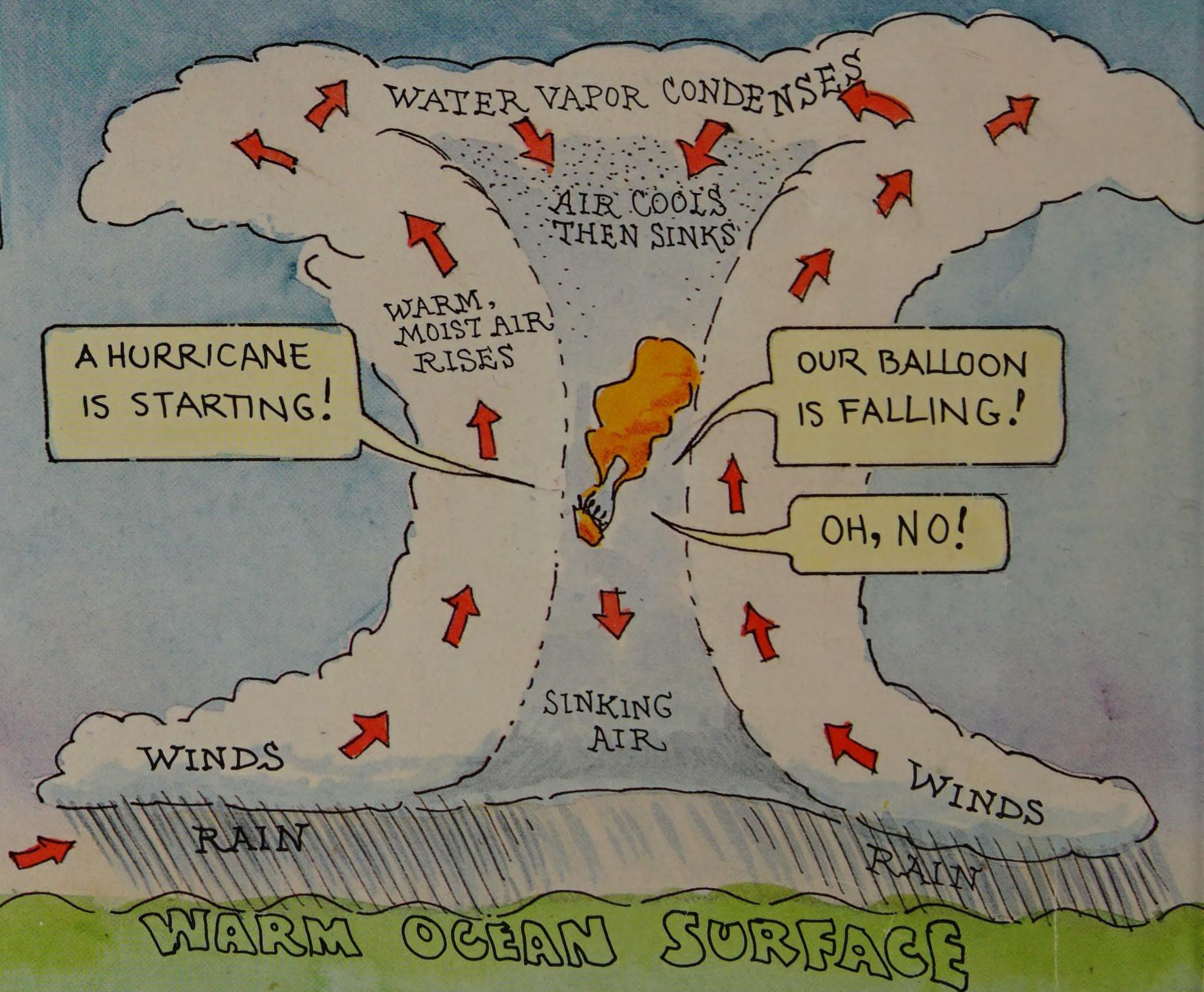
Most hurricanes begin in the late summer and early fall. That is when tropical oceans are

warmest.

The warmer the ocean is, the stronger the hurricane is likely to become.



"Class, remember that as hot air rises from the ocean surface, the water vapor in the air condenses and forms clouds," said the Friz. Down below, more hot air rushed in from all sides to take the place of the rising air. In the middle of the rising air, a column of sinking air formed. We started sinking with it.



"Oh dear," said Ms. Frizzle.

"The balloon must have sprung a leak."

Hot air was rushing out, and the balloon was plummeting fast.

"Jump ship, class!" shouted the Friz.

She jumped overboard, and we went after her. Right away, we knew it was a big mistake.

DO ALL TROPICAL STORMS
BECOME HURRICANES?

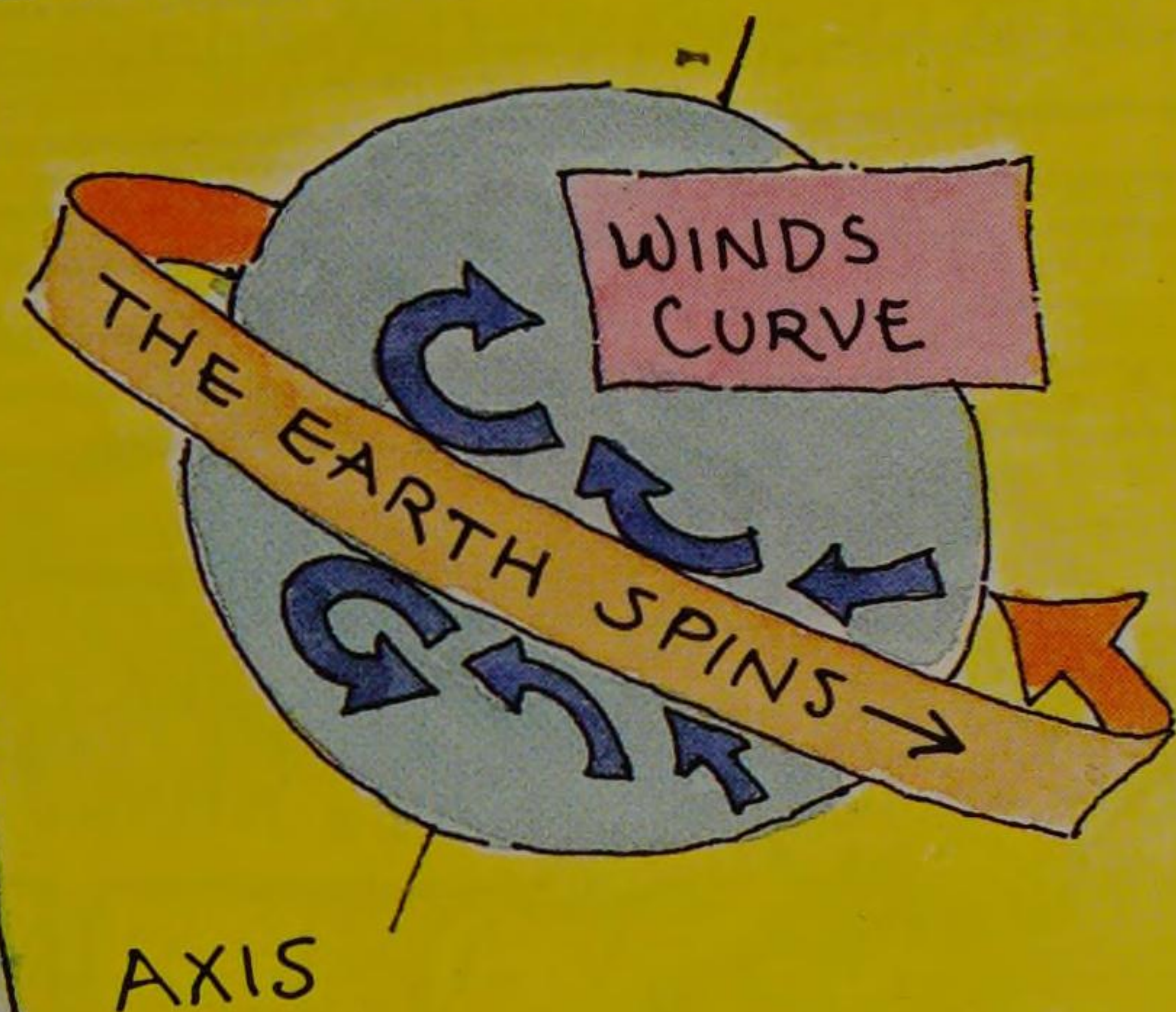
by Amanda Jane

No. All around the world, there are more than 100 tropical storms each year. Only about 60 of them grow to hurricane strength. And only a handful of those ever reach places where people live.



WHAT MAKES HURRICANE
WINDS BLOW IN A CIRCLE?
by Alex

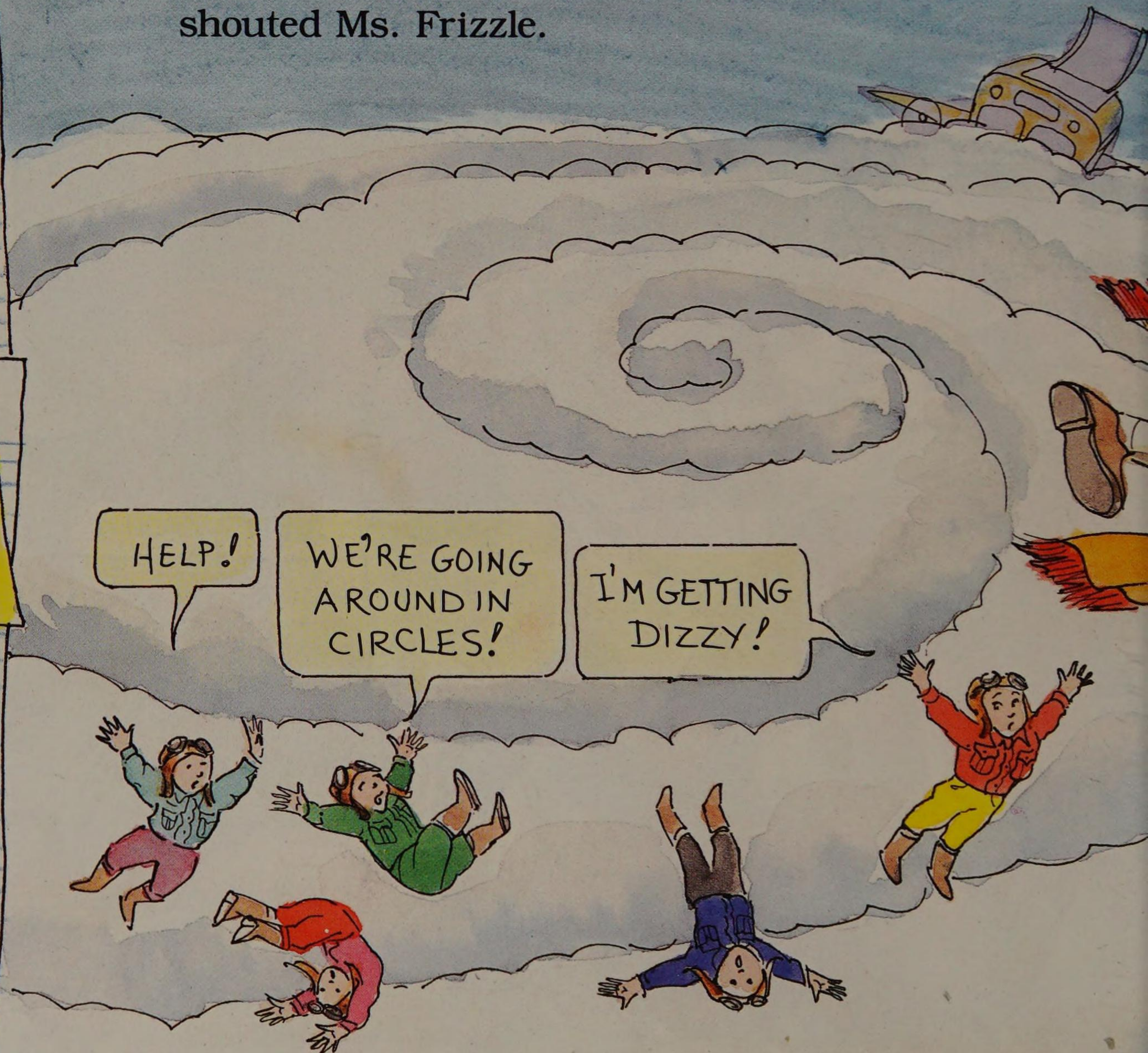
Winds begin by blowing
straight. But the
movement of the earth
as it spins on its axis
makes them curve.



The faster winds blow,
the more they curve.
Hurricane winds are very
fast, so they curve and
curve until they make
a circle.

The wind was blowing the clouds
into a huge circle.

"The storm is starting to take on the
typical shape of a hurricane.
Isn't it fascinating, children?"
shouted Ms. Frizzle.

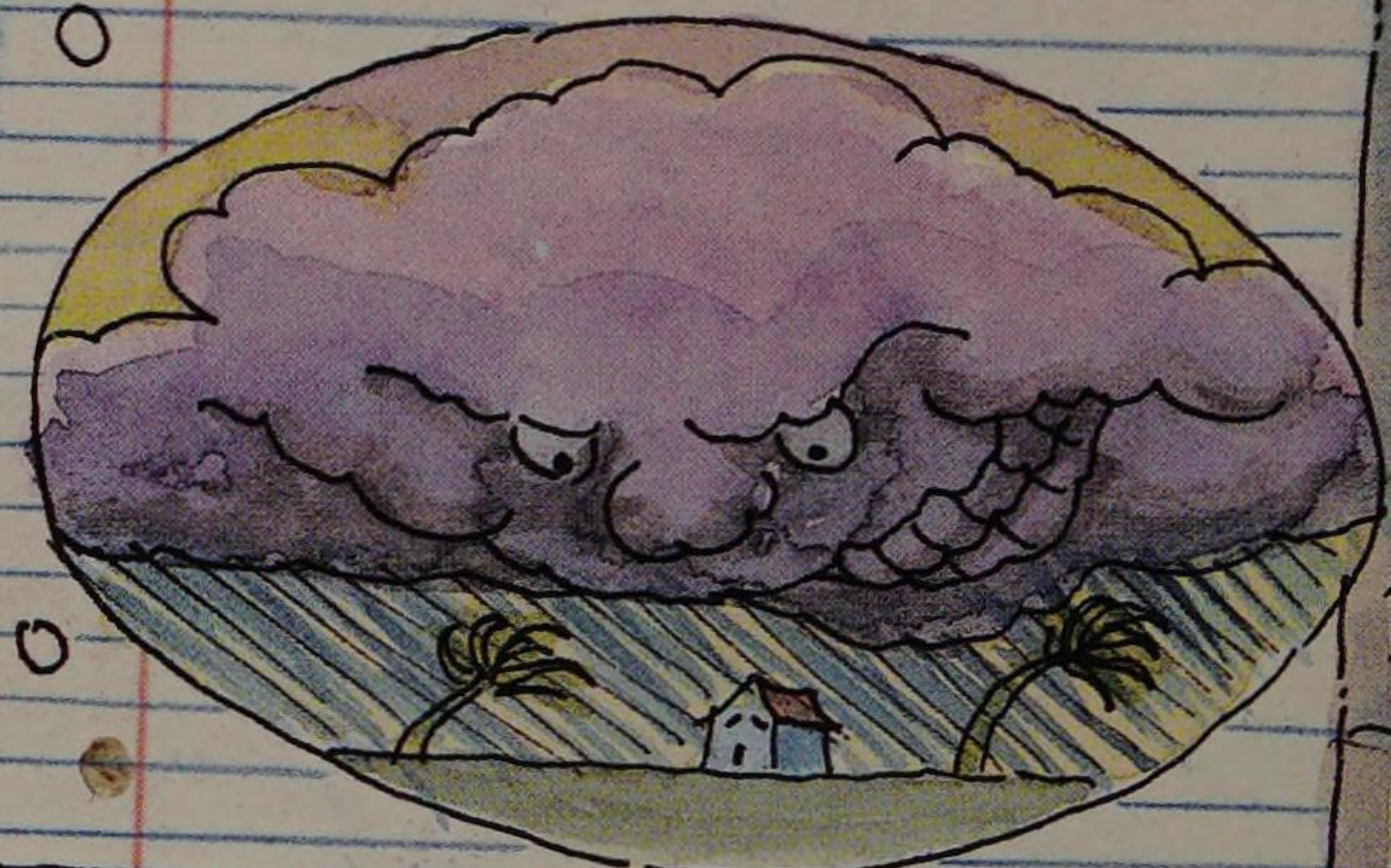


It was more than fascinating.
It was terrifying!
We were caught in the edge of the storm,
blowing around and around in a giant whirlwind.
That whirlwind was a hurricane!

A TYPICAL HURRICANE
HAS A LIFE SPAN
OF ABOUT 10 DAYS.

LISTENERS- WE'LL
BE TELLING YOU
ABOUT THE
WHOLE HURRICANE.

MAYBE ITS
BATTERIES WILL
RUN OUT SOON.



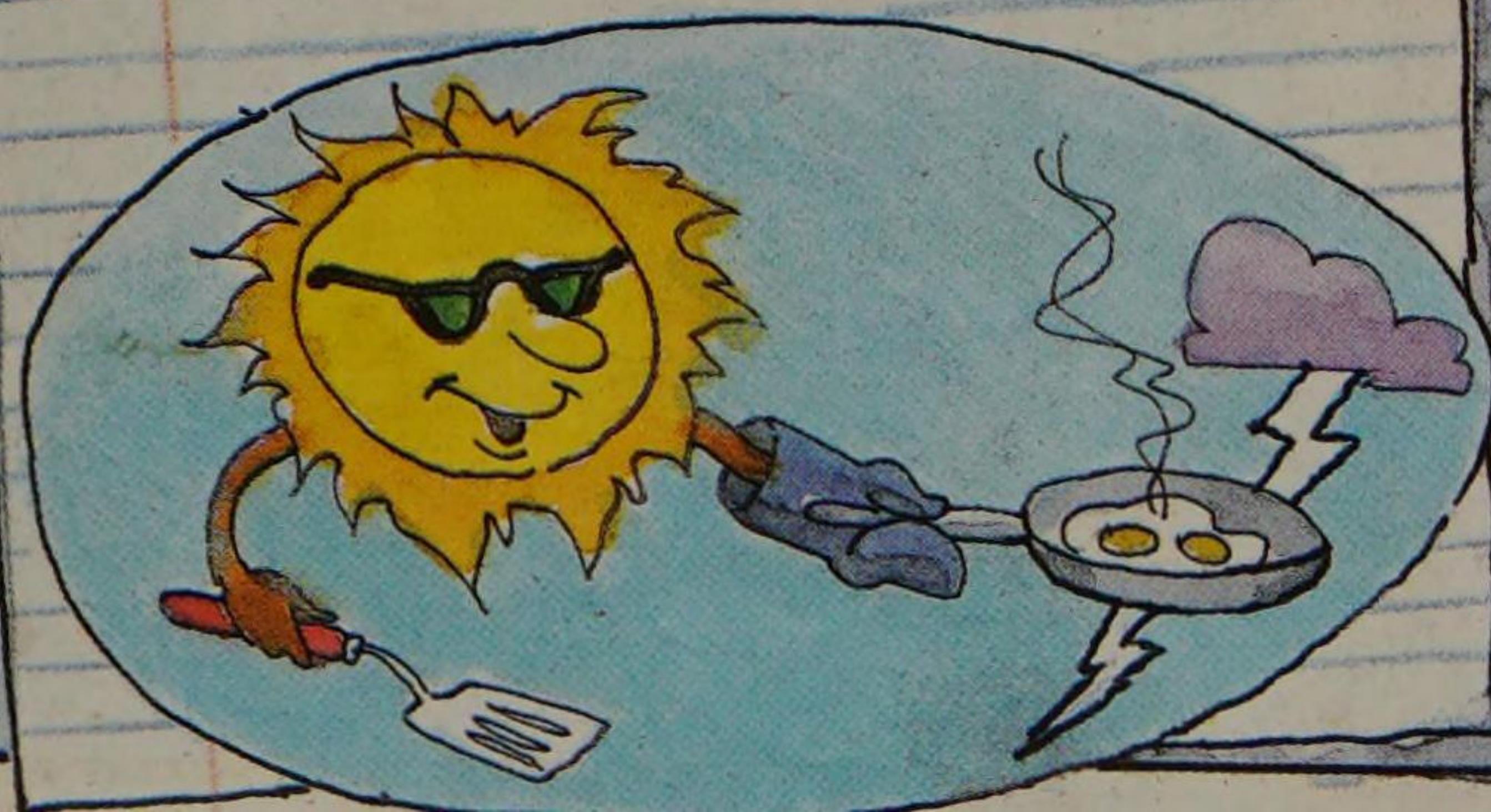
LIGHTNING IS ELECTRICITY
by Ralphie

- Clouds become charged with electricity. When the voltage gets high enough, electricity leaps from one place to another. Then we see lightning.



LIGHTNING IS HOT!
by Keesha

- A lightning bolt reaches a temperature of $50,000^{\circ}\text{F}$. That's about five times hotter than the sun's surface!



In the clouds around us, huge bolts of lightning were flashing. We thought it was all over for us, but then we saw the bus again. It had become a weather plane — the kind that explores hurricanes. We tumbled into a rescue chute and fell onto the plane . . . that is, the bus . . . er . . . we mean the plane.



DURING A THUNDER-STORM, LIGHTNING CAN MAKE MORE ELECTRICITY THAN A BIG CITY USES IN A WEEK!

IT'S OUR BUS!

IT LOOKS DIFFERENT!

LET'S GET ON NOW!

COME BACK!

Thunder crashed and boomed.
We covered our ears.
Ms. Frizzle turned the plane,
and we headed straight toward
the center of the storm.
We had the feeling someone
was missing.

WE ARE NOW
EXPERIENCING
THE HURRICANE
CLOSE UP....

BUT NOT TO WORRY,
ARNOLD, I'M SURE
WE'LL BE FINE.

BOOOOM

THUNDER IS A SOUND MADE
BY AIR

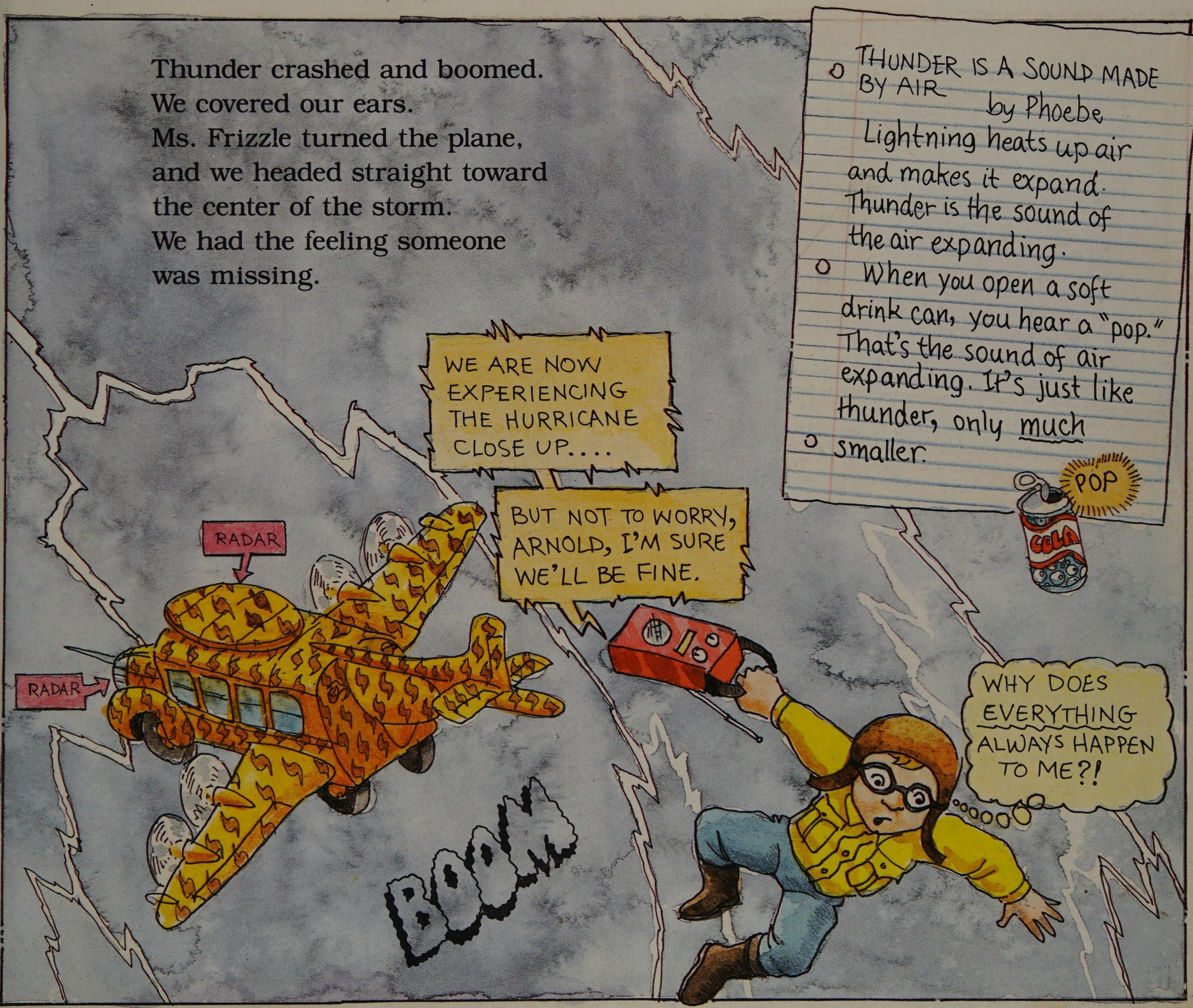
by Phoebe

Lightning heats up air
and makes it expand.
Thunder is the sound of
the air expanding.

When you open a soft
drink can, you hear a "pop."
That's the sound of air
expanding. It's just like
thunder, only much
smaller.



WHY DOES
EVERYTHING
ALWAYS HAPPEN
TO ME?!



THUNDERSTORMS: RAIN, RAIN,
AND MORE RAIN

by Florrie

In 20 minutes, one
thunderstorm sends down
125 million gallons
of water!

We flew through miles of thunderstorms,
and Ms. Frizzle took roll call.
Guess who was missing — Arnold!
He had fallen and missed the plane!

ARNOLD FELL!

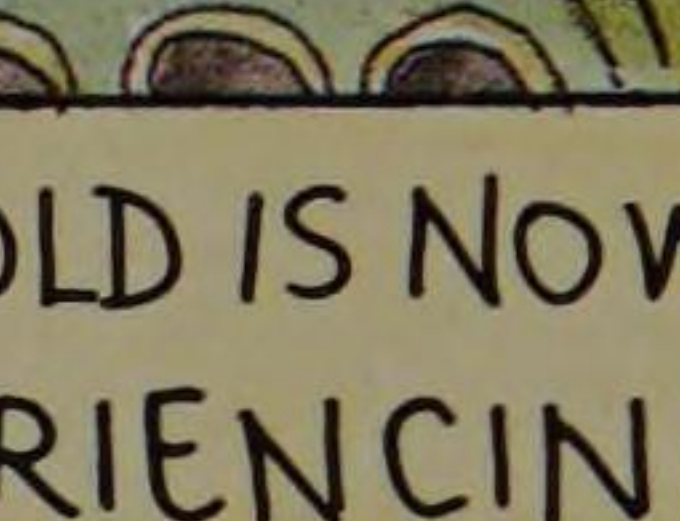
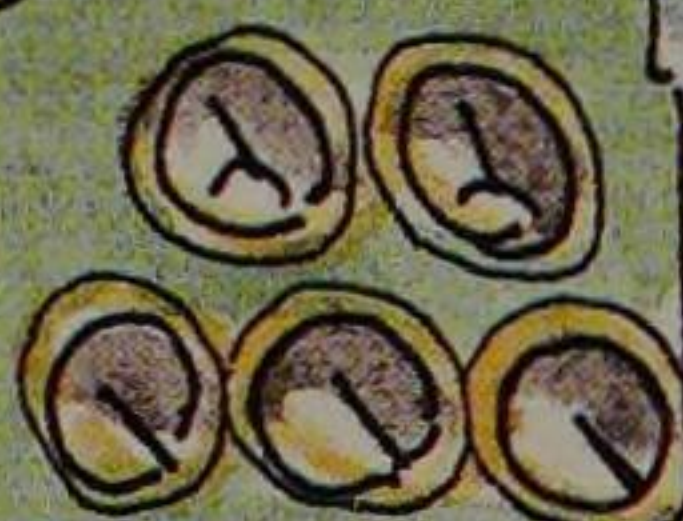
ARNOLD IS NOW
EXPERIENCING
THE HURRICANE
CLOSE UP....

BUT NOT TO WORRY,
TIM. I'M SURE
HE'LL BE FINE.

POOR
KID!

OH NO!

Where We Are in the Hurricane

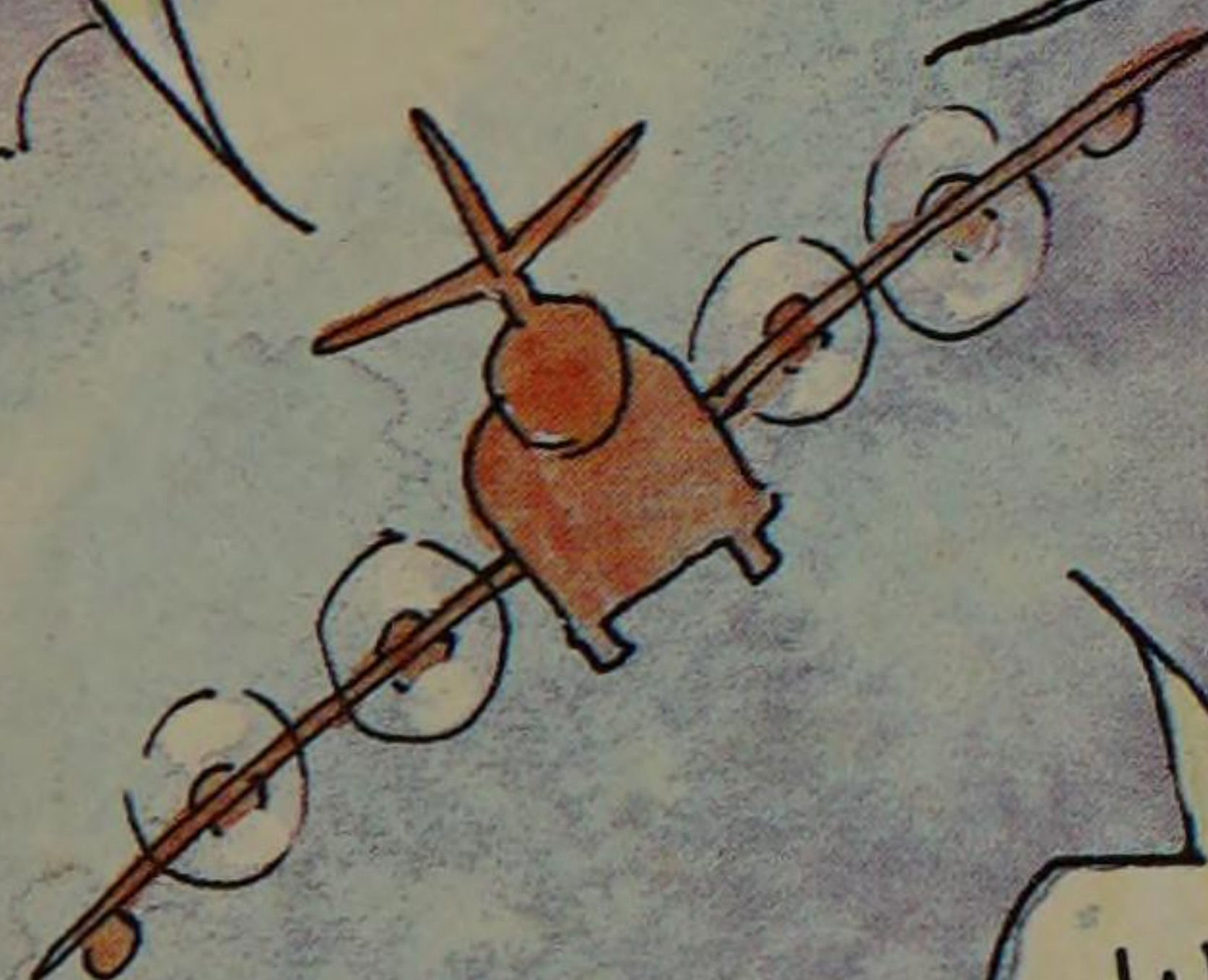


Ms. Frizzle marked Arnold absent
and flew straight into the storm.

WE'RE FLYING
INTO THE
HURRICANE!

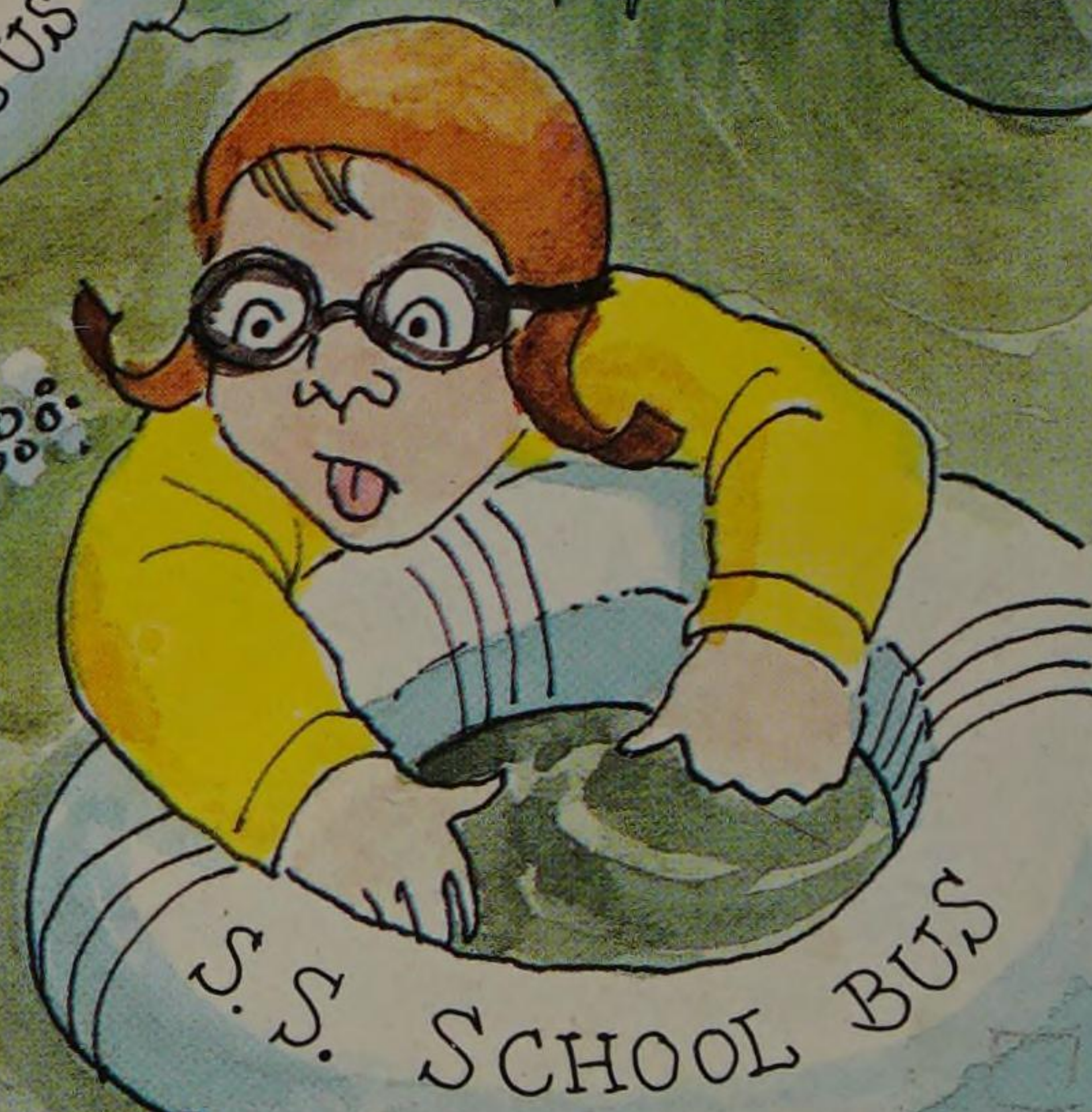
WHAT A
DISASTER!

WHY DOES
EVERYTHING
ALWAYS HAPPEN
TO US?!



WE'LL BE SEEING
STORMY SEAS
TODAY, ARNOLD.

SEEING STORMY SEAS?!
I'M TOUCHING THEM...
SMELLING THEM...
GULP!...TASTING THEM!



How FAST DO THE WINDS BLOW
INSIDE A HURRICANE?

by Carmen

Outer hurricane	40 mph
Middle hurricane	74 mph
Inner hurricane	120-150 mph

How FAST IS THE WIND BLOWING
AT THE EYE WALL, KIDS?



The farther in we went,
the faster the winds blew.

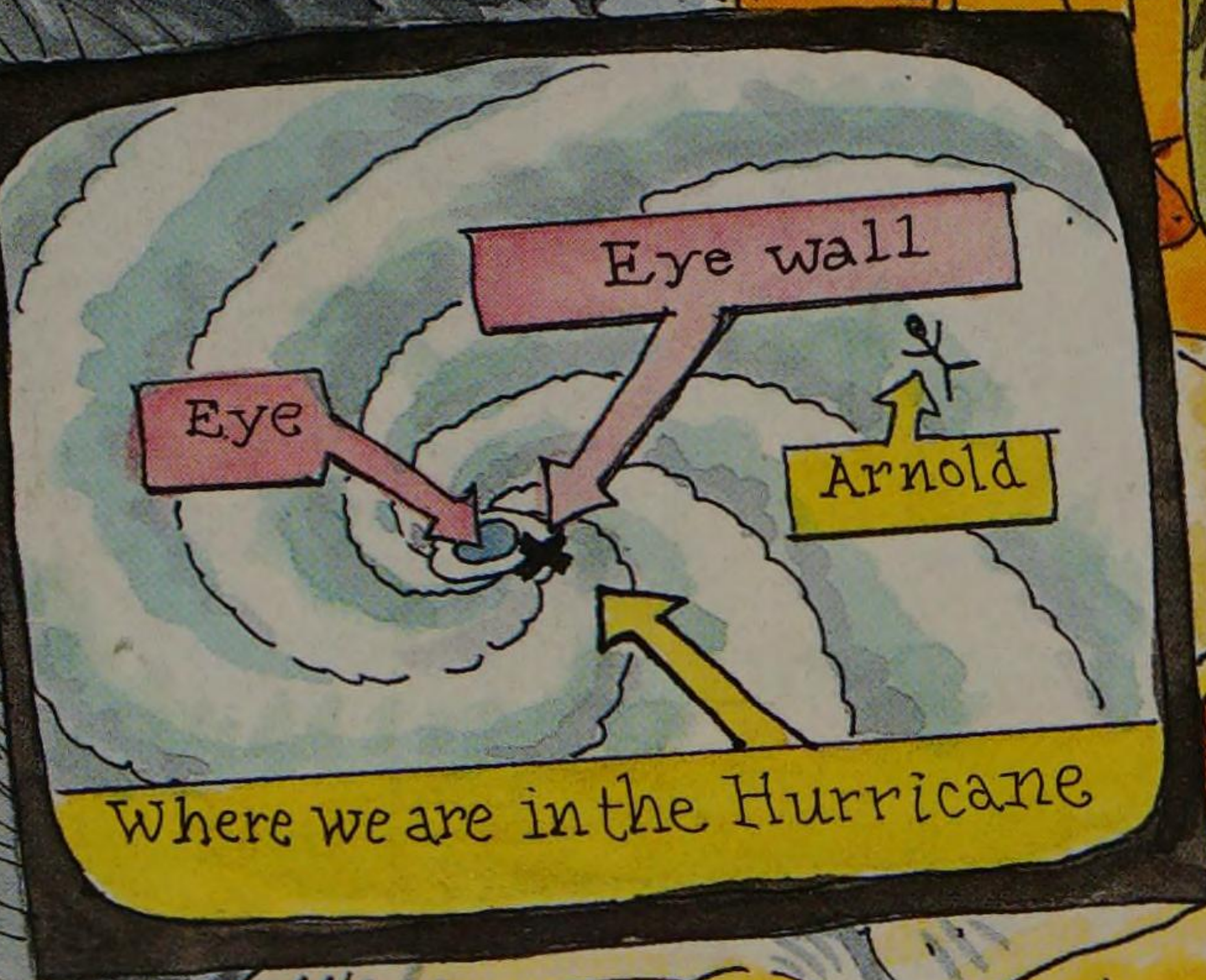
At last, we came to the inner hurricane
and entered the eye wall — a ring of
heavy clouds around the storm's center.
In the eye wall, the winds
were blowing the fastest yet!
And the rain was coming down
in sheets!

THE EYE WALL IS
THE FIERCEST PART
OF THE HURRICANE!

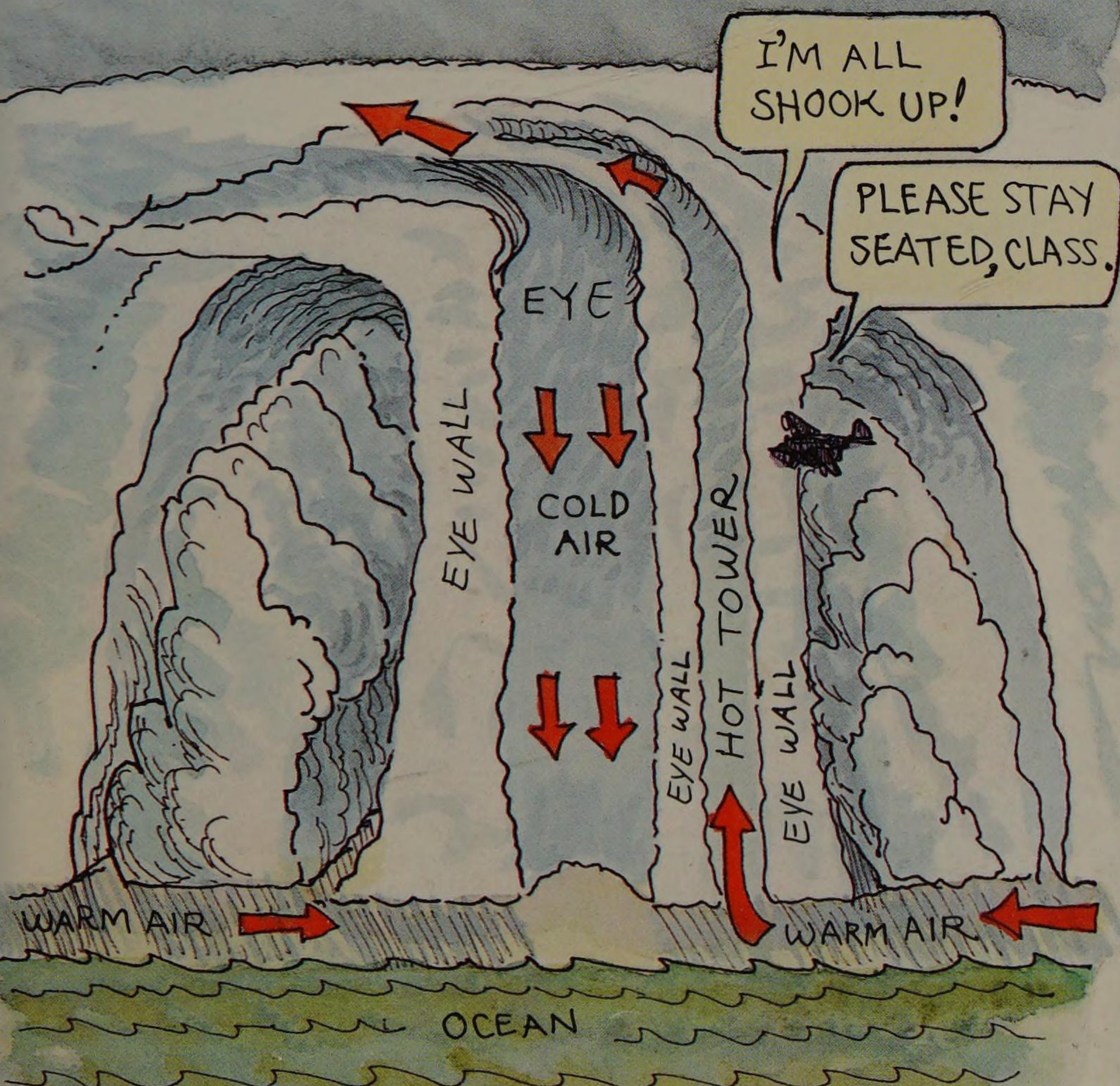
WE'RE ENCOUNTERING
TURBULENCE, CLASS.

TURBULENCE
IS WHEN THE AIR
IS VIOLENTLY
DISTURBED.

I AM VIOLENTLY
DISTURBED!



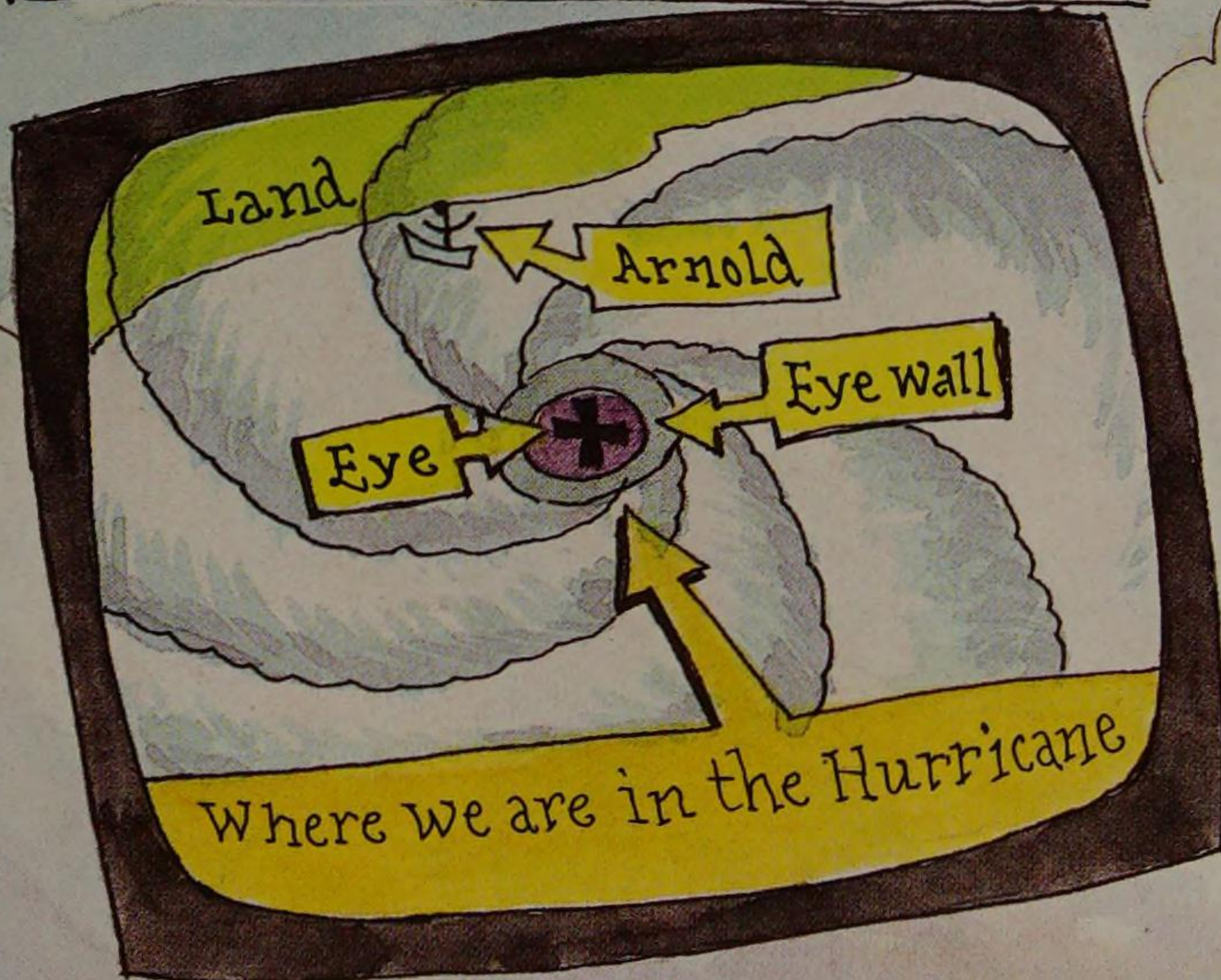
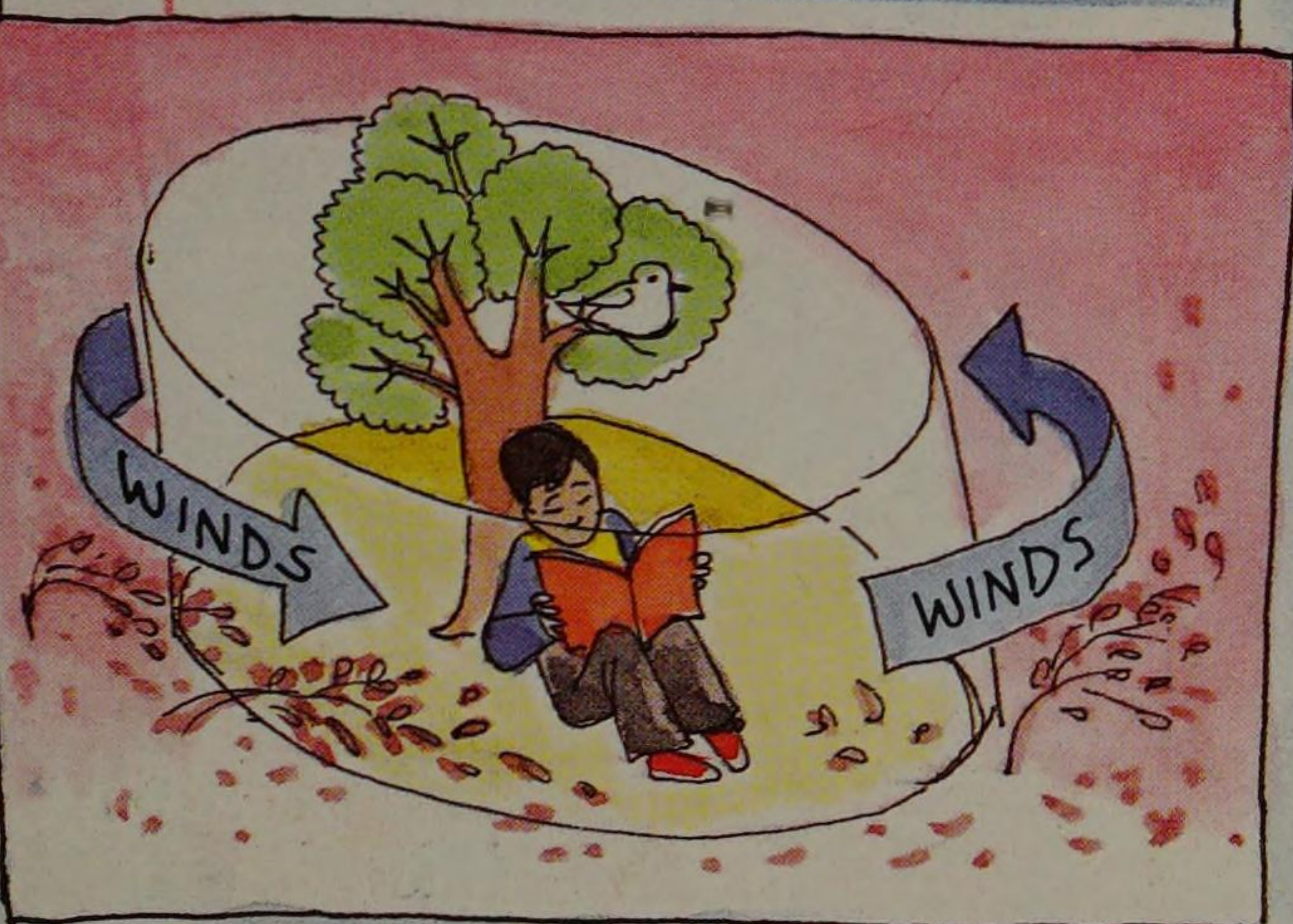
All around were columns of air called hot towers, or chimneys. They were sucking up more and more hot moist air from the ocean. The heat energy from the air was feeding the storm and making it stronger. The plane was shaking and so were we!



IT'S QUIET IN THE EYE OF A
HURRICANE

by Carlos

The fierce swirling winds
of the hurricane do not
enter the center of the
storm.



Then suddenly everything was quiet.

"Class, we have entered the eye — or center —
of the hurricane!" announced Ms. Frizzle.

The ocean waves still crashed below
and the winds howled outside,
but in the eye only gentle breezes blew.

Up above, the sky was blue
and the sun was shining.

We relaxed and enjoyed ourselves.



We flew about thirty miles across the eye. Then the Friz called out, "We will enter the other side of the eye wall now." "Don't go!" we cried, but the plane was already on its way — back into the hurricane's fierce wind and rain.

WHY DON'T HURRICANE WINDS BLOW INTO THE EYE?

by Shirley

- The winds swirl in toward the eye of the storm, but they do not enter it because
- they are pushed out by the same force that pushes you outward when you spin around.



HOW HURRICANES TRAVEL

by Wanda

When a hurricane starts, it usually moves slowly—about 10 to 20 miles per hour.

As the storm gets farther north, its speed can increase up to 60 miles per hour!

Hurricanes can travel hundreds of miles each day.

The entire hurricane was moving across the ocean toward land, and we were going with it!

“The right forward corner of the hurricane as you are looking toward land has the strongest wind and rain and the highest ocean waves,” shouted the Friz. Naturally, she flew directly into that part.



WHICH PART OF THE HURRICANE IS STRONGEST?

by Florrie

The right front corner is strongest because the whirling winds are circling toward the shore. They add their strength to the winds that move the storm forward.

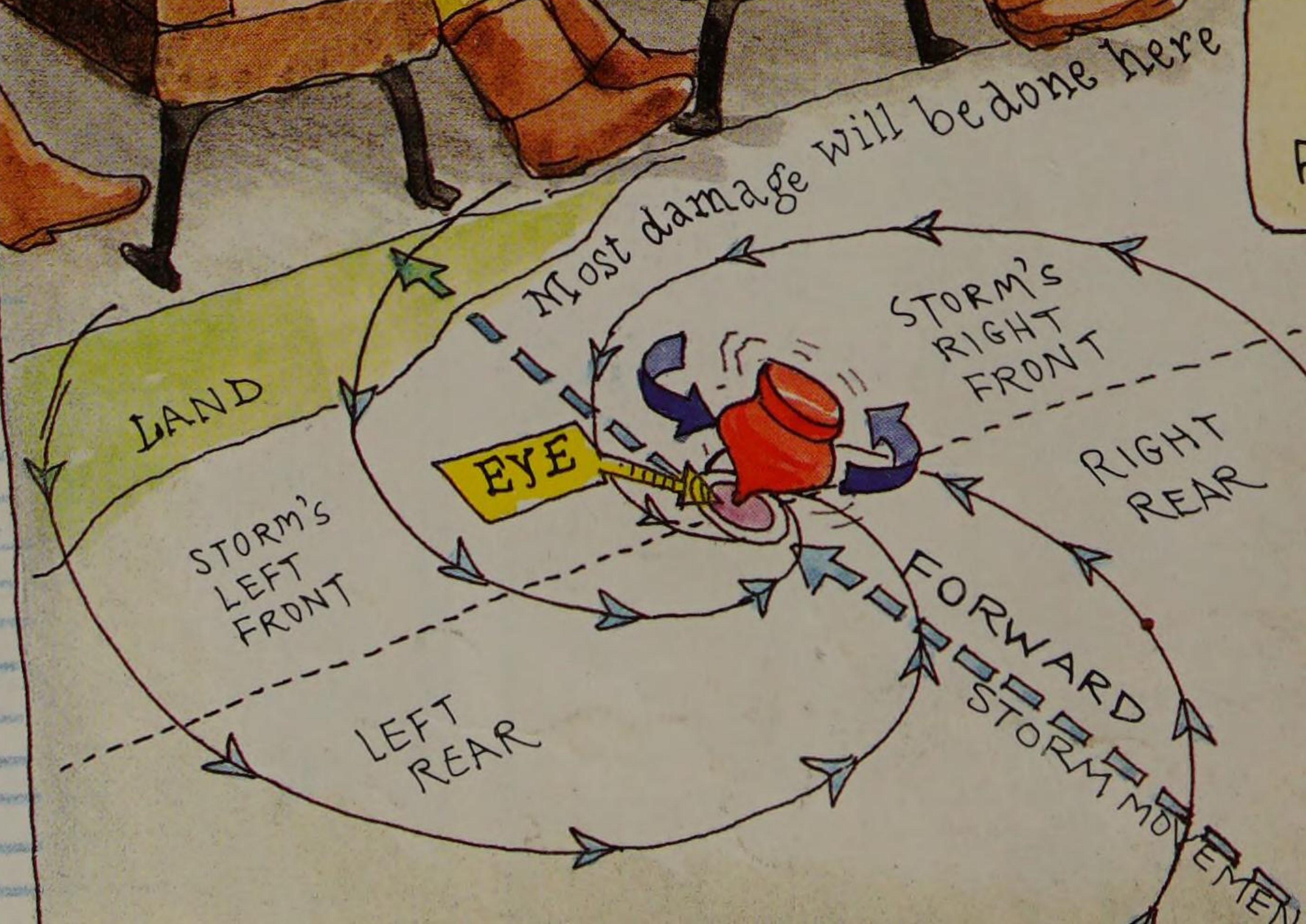


A HURRICANE MOVES LIKE A TOP SPINNING ACROSS THE FLOOR.

IT MOVES TWO WAYS—

IT SPINS AROUND...

...AND, IT TRAVELS FORWARD.



ARNOLD
SHOULD BE
REACHING LAND
ANY MINUTE NOW.

LET'S TAKE
A SPIN.

THE HURRICANE
SHOULD BE
REACHING LAND
ANY MINUTE NOW.

WE MUST
EVACUATE
BEFORE THE
FLOODS COME.

TELL ME
ABOUT IT!

SALT WATER
TAFFY

HURRICANE
EVACUATION
ROUTE

ANOTHER WEATHER WORD
by Dorothy Ann
When people evacuate
an area, they get out
of there fast!

HURRICANES... THEN AND NOW

by Ralphie

In the past, there was less property damage.

Today, coastal areas are

more built up. So more houses

and buildings are damaged in hurricanes.

But today, not as many lives are lost! In past times, many people were killed because no one knew when hurricanes were coming.

Today, weather forecasts tell us to get ready for hurricanes.

As the hurricane approached land, the wind pulled up trees by the roots and blew the roofs off houses.

It also blew ashore a huge dome of water called the storm surge.

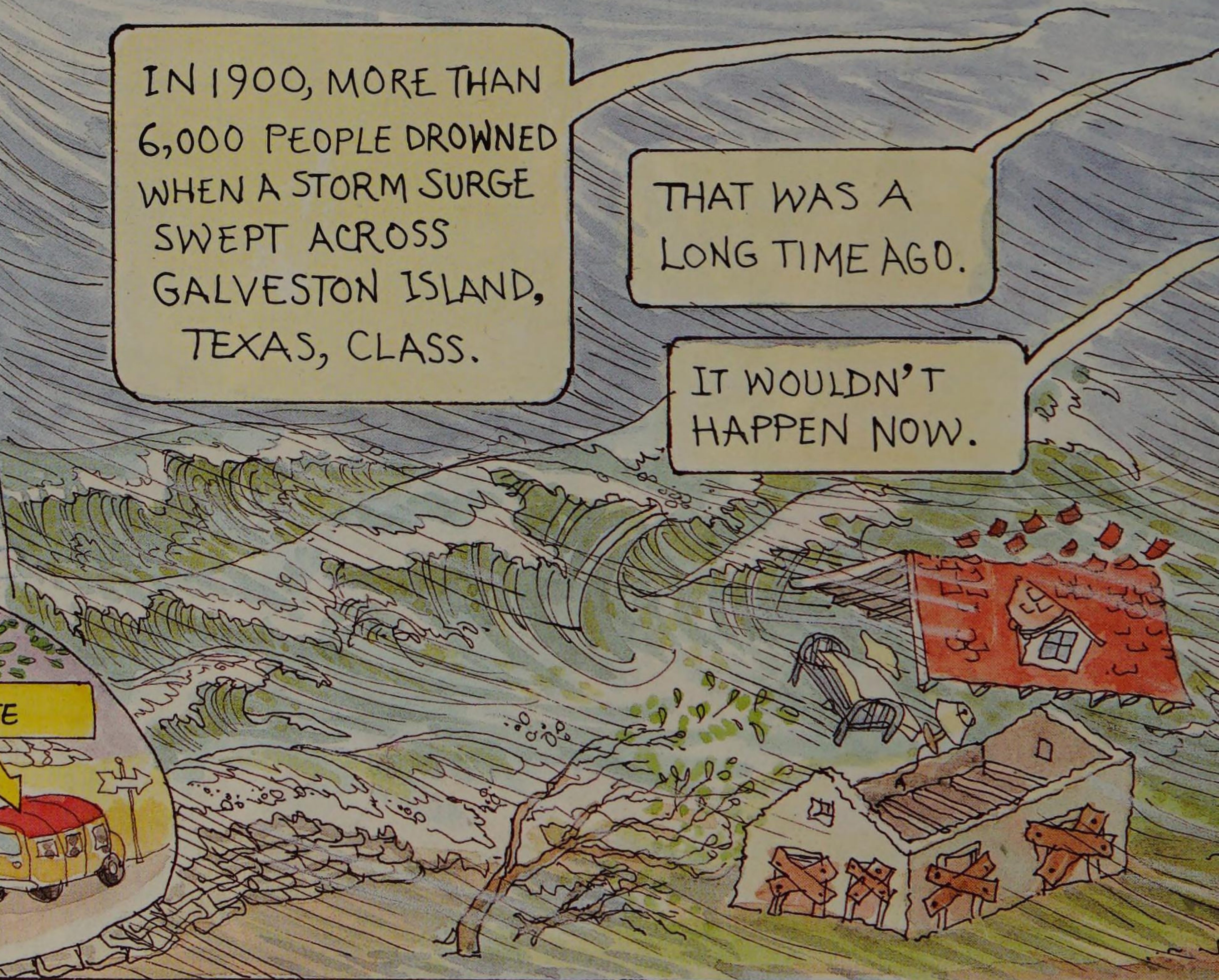
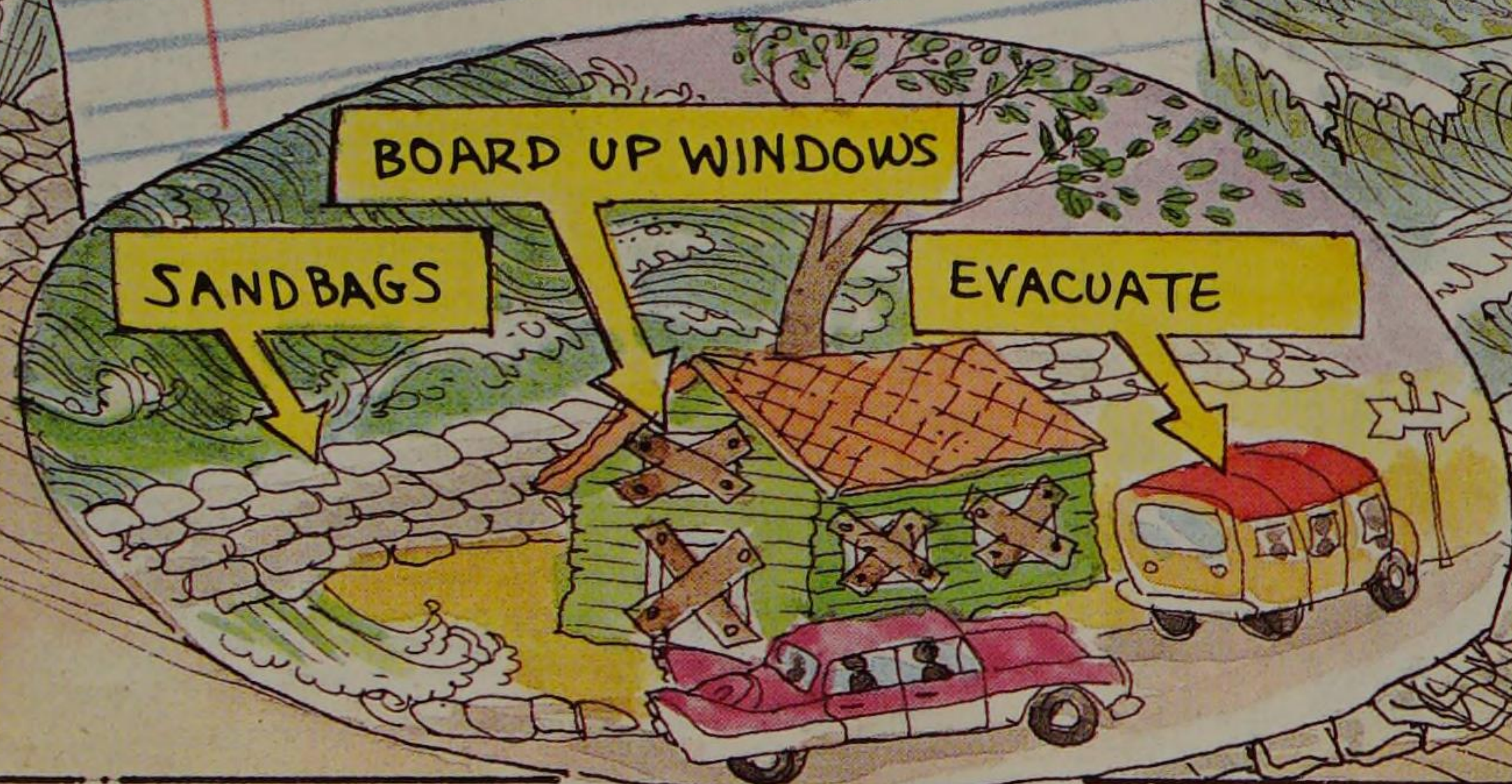
The ocean rose ten feet higher than usual and, on top of that, there were giant waves.

We were horrified as we watched the storm surge sweep over the shore below.

IN 1900, MORE THAN 6,000 PEOPLE DROWNED WHEN A STORM SURGE SWEEP ACROSS GALVESTON ISLAND, TEXAS, CLASS.

THAT WAS A LONG TIME AGO.

IT WOULDN'T HAPPEN NOW.



But that was nothing compared to the horror we felt when we heard the Friz shouting above the sound of roaring water,

"We seem to be running out of gas, children!"

Sure enough, the plane was dipping lower and lower.

As we fell into the water, we saw Arnold waving to us from a nearby roof.

THAT KID LOOKS FAMILIAR.

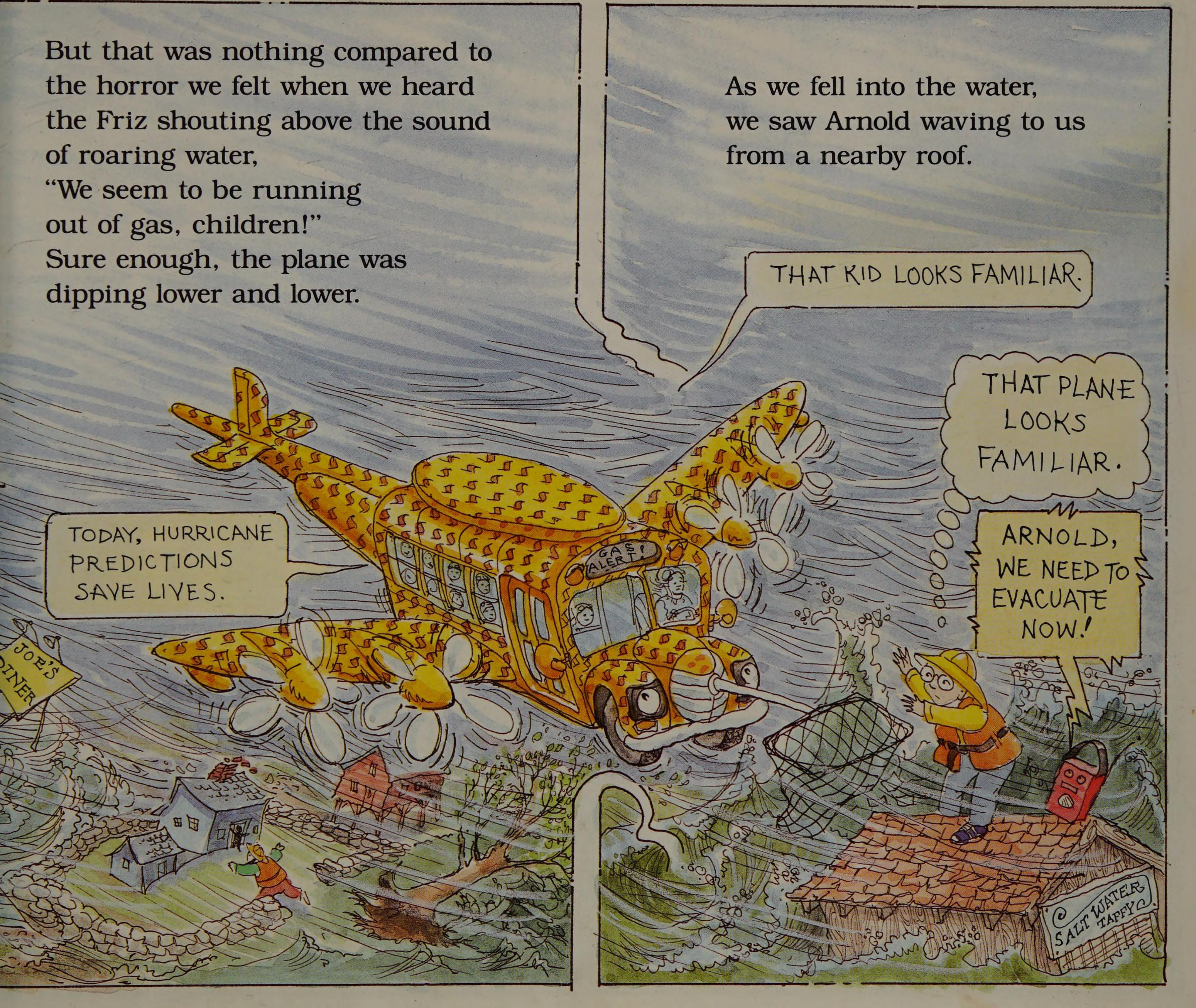
THAT PLANE LOOKS FAMILIAR.

ARNOLD, WE NEED TO EVACUATE NOW!

TODAY, HURRICANE PREDICTIONS SAVE LIVES.

JOE'S DINER

SALT WATER TAFFY



WHAT IS A TORNADO?

by Arnold

A tornado is a twisting funnel-shaped whirlwind that hangs from a thunder cloud.

Somehow Arnold managed to get on the plane before we were swept away by the waves at the front edge of the hurricane. The water was creeping up the windows. The plane was going to sink for sure! Then we saw a dark, funnel shape coming our way.

50,000 feet up

Huge Thundercloud

WE FELL INTO THE OCEAN....

WE FLEW INTO THE EYE....

A FISHING BOAT
PICKED US UP....

THE EYE WALL
WAS THE WORST....

WE THOUGHT WE
WERE GONERS!

WE THOUGHT WE
WERE GONERS!

WE ARE GONERS!

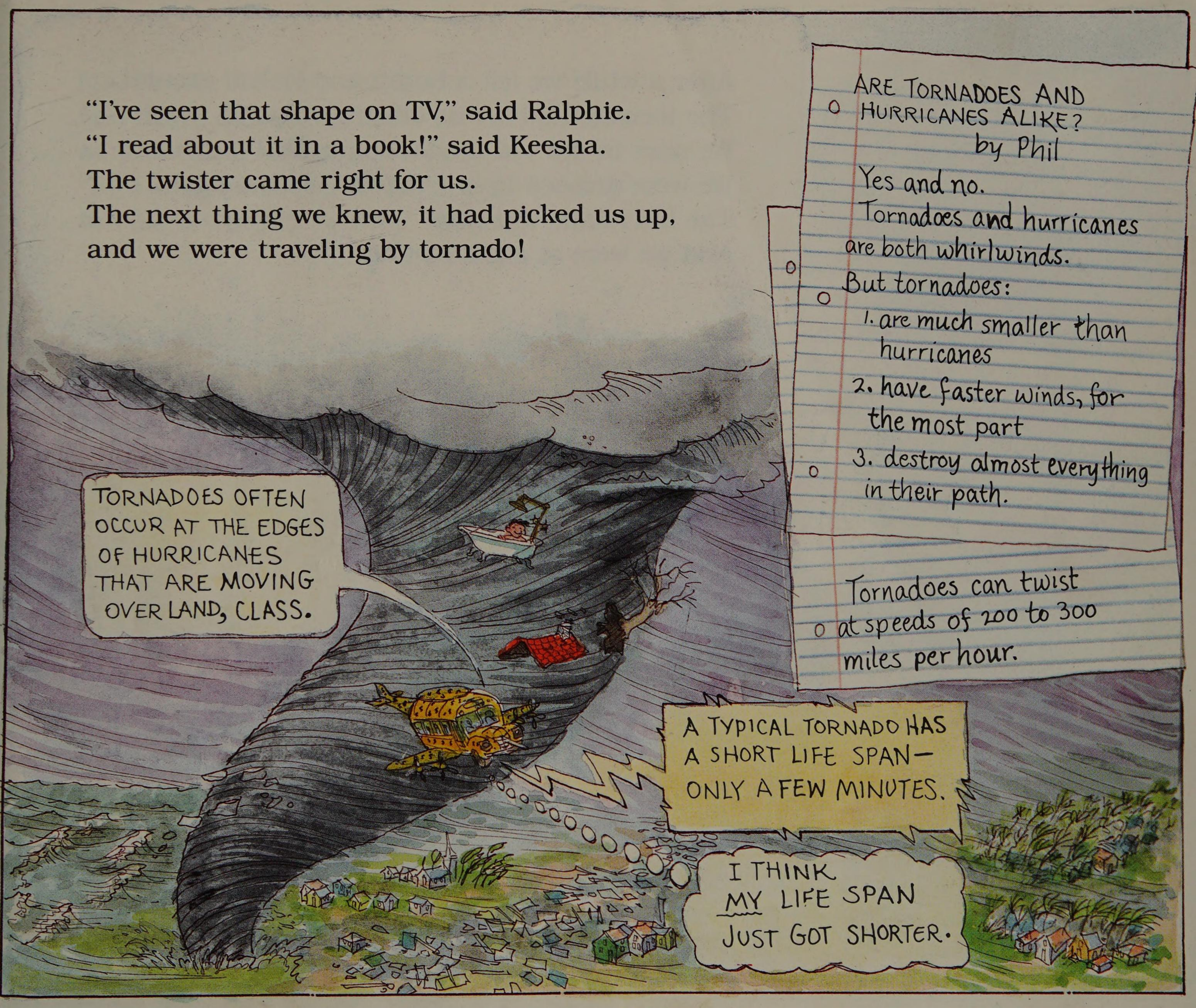


"I've seen that shape on TV," said Ralphie.

"I read about it in a book!" said Keesha.

The twister came right for us.

The next thing we knew, it had picked us up,
and we were traveling by tornado!



TORNADOES OFTEN
OCCUR AT THE EDGES
OF HURRICANES
THAT ARE MOVING
OVER LAND, CLASS.

A TYPICAL TORNADO HAS
A SHORT LIFE SPAN—
ONLY A FEW MINUTES.

I THINK
MY LIFE SPAN
JUST GOT SHORTER.

ARE TORNADOES AND
HURRICANES ALIKE?
by Phil

Yes and no.

Tornadoes and hurricanes
are both whirlwinds.

But tornadoes:

1. are much smaller than hurricanes
2. have faster winds, for the most part
3. destroy almost everything in their path.

Tornadoes can twist
at speeds of 200 to 300
miles per hour.

CAN TORNADES REALLY
CARRY OBJECTS?

by Keesha

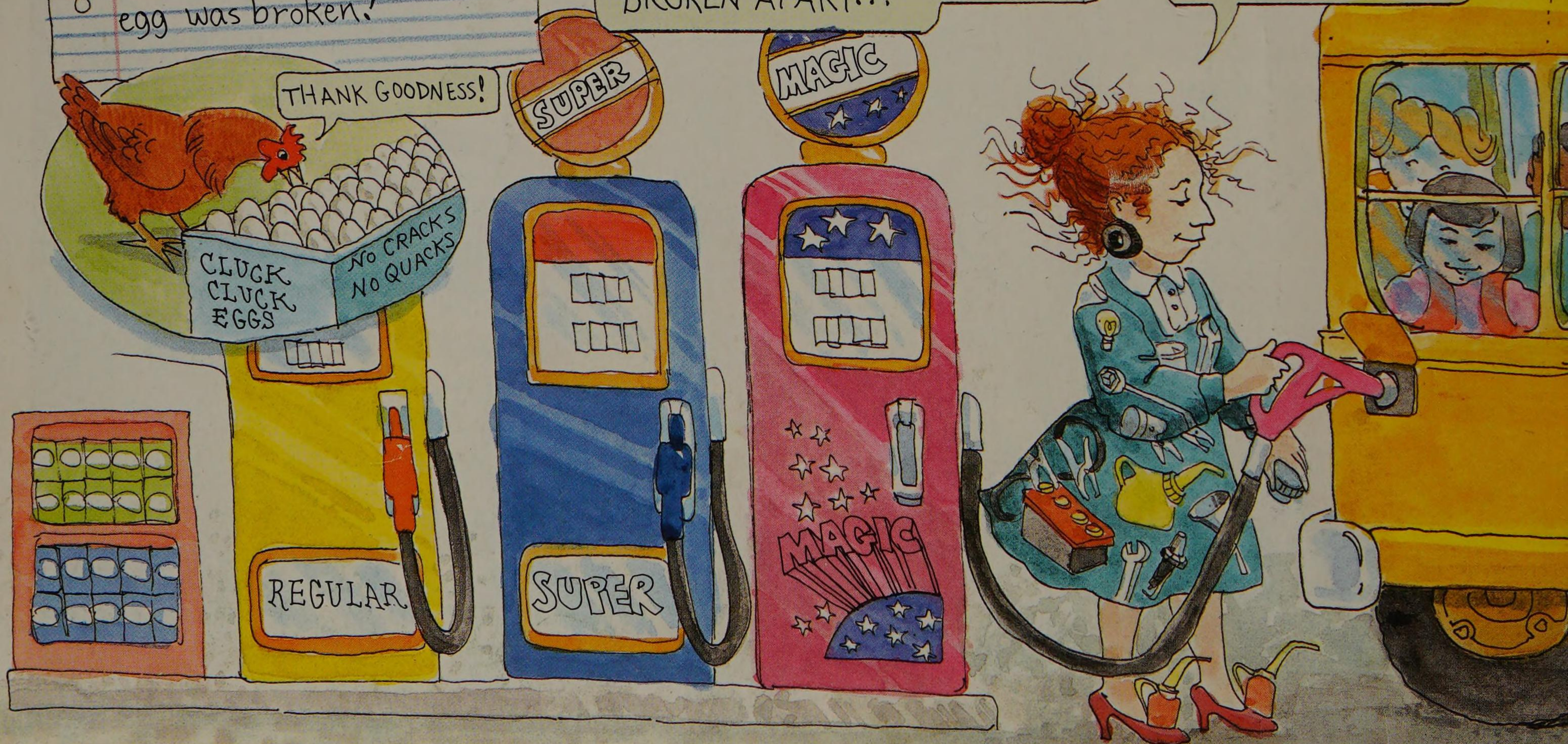
Yes! Tornadoes are like
giant vacuum cleaners.
They lift dirt, trash, and
even large objects, such as
houses, cars, trees, and
railroad trains!

Once a tornado picked up
a crate of eggs and set them
down miles away. Not one
egg was broken!

After a while we felt a bump and looked around.
The tornado had set us down gently.
We were in our old school bus again.
We were dressed in our regular clothes again.
The hurricane was over.
And we were at a gas station.

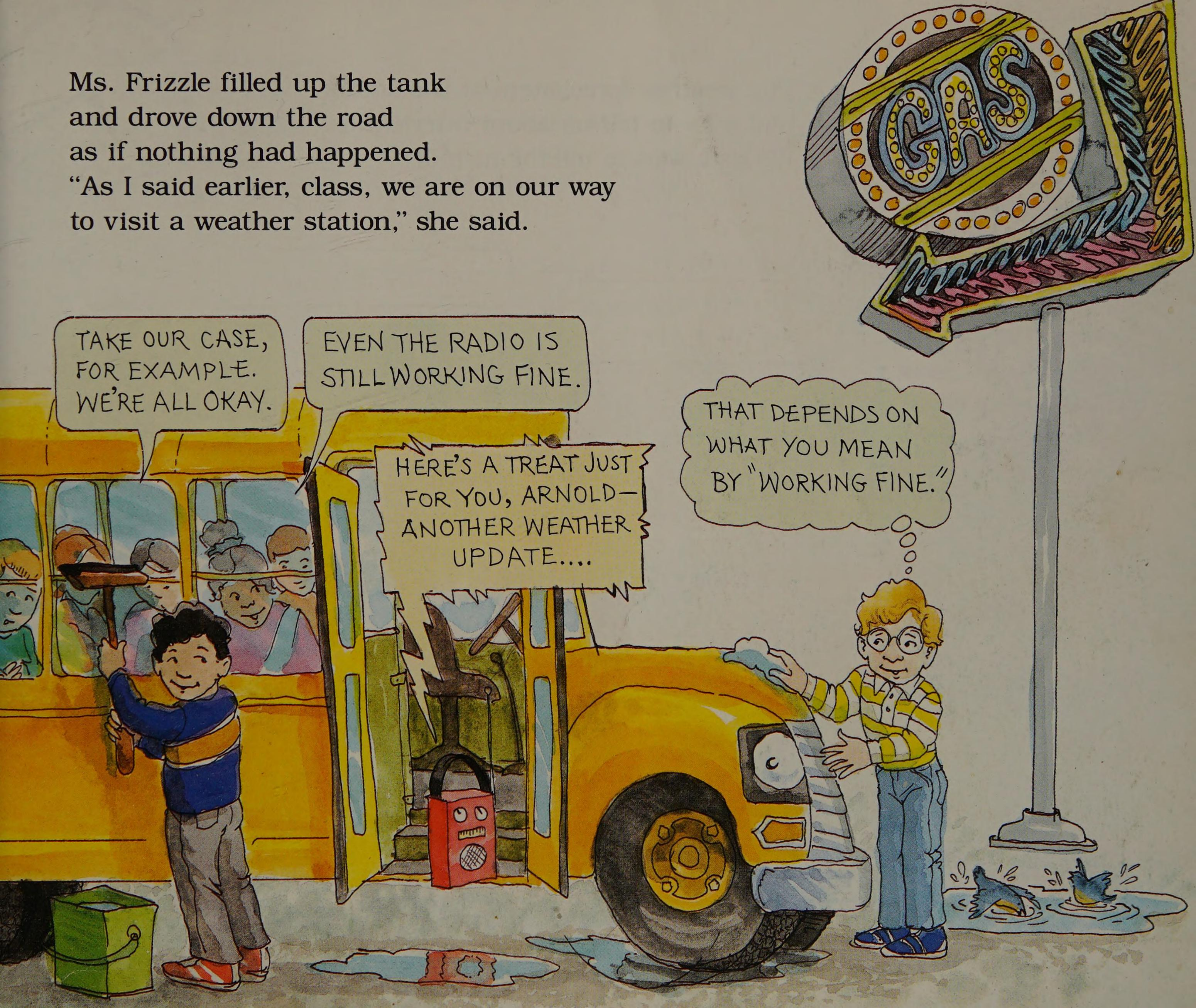
USUALLY THE THINGS THAT ARE
PICKED UP BY A TORNADO ARE
BROKEN APART...

BUT NOT ALWAYS.



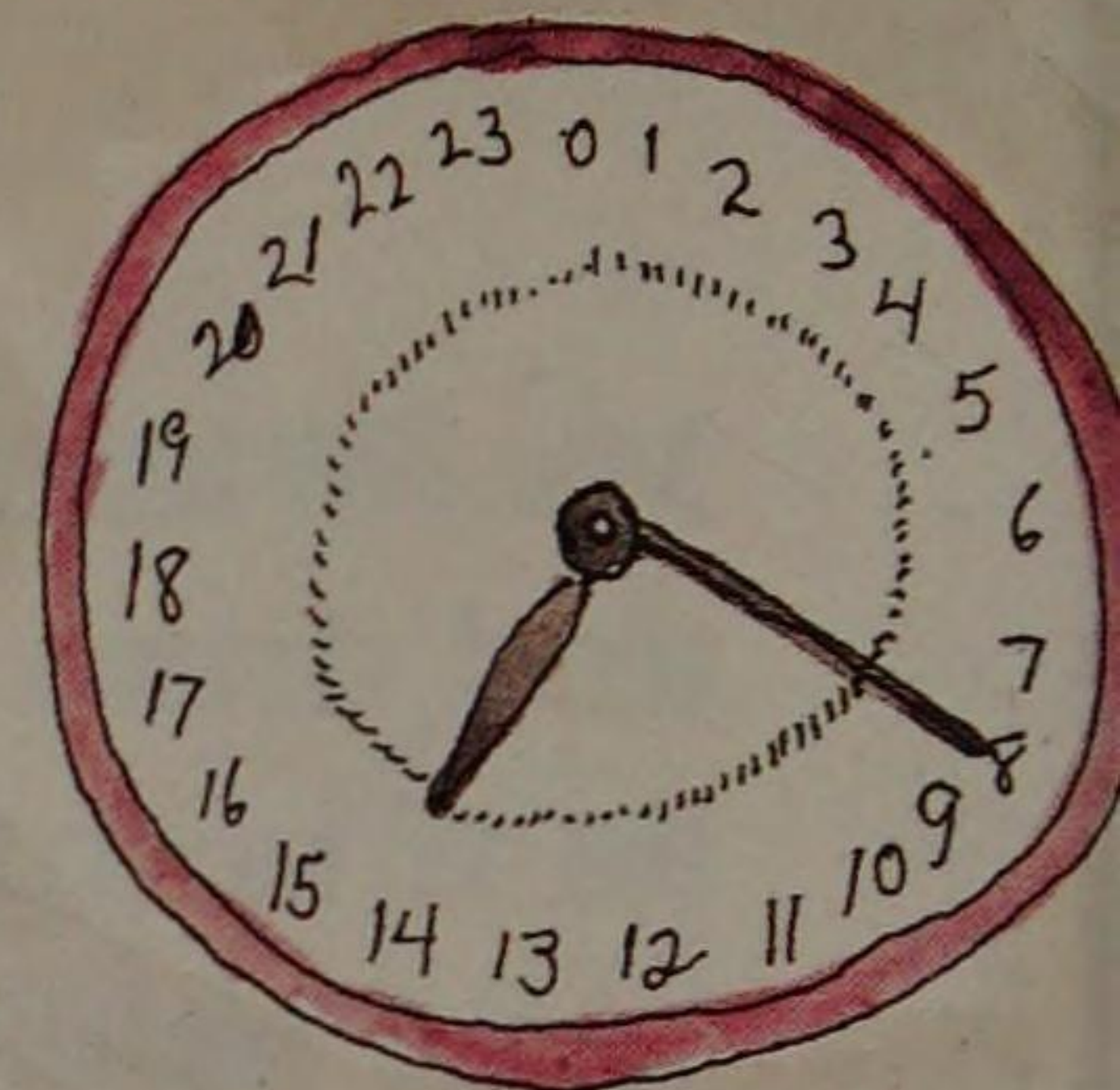
Ms. Frizzle filled up the tank and drove down the road as if nothing had happened.

"As I said earlier, class, we are on our way to visit a weather station," she said.



WEATHER STATION

The weather forecasters at the station had a lot to tell us about hurricanes. We had a lot to tell *them*, too!



HURRICANE

ARE YOU PREPARED?

HURRICANE WINDS
SWIRL IN A CIRCLE
BECAUSE...

...OF THE ROTATION
OF THE EARTH.

HEY...THAT'S RIGHT....



A HURRICANE
FROM START
TO FINISH



1. HOT AIR RISES
OVER TROPICAL OCEANS
NEAR EQUATOR
2. THUNDERCLOUDS
FORM



3. WINDS BEGIN
CIRCLING AROUND
EYE OF STORM



4. STORM TRAVELS



A HURRICANE
DIES AS IT MOVES
OVER LAND
BECAUSE...

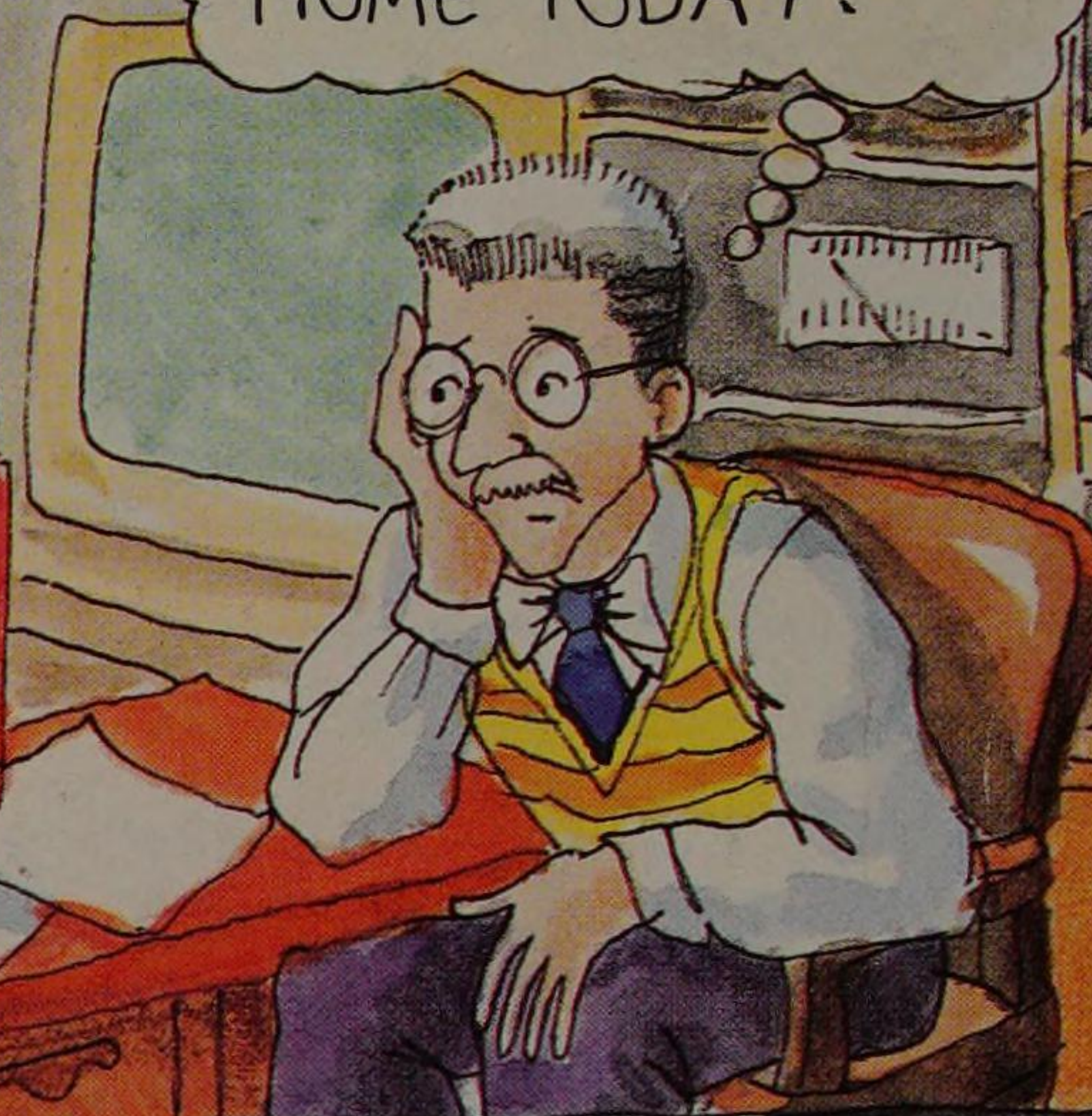
...THERE IS NO MORE
HOT, MOIST OCEAN
AIR TO FUEL THE
STORM.

THE KIDS
KNOW A LOT
ABOUT
HURRICANES
DON'T THEY,
AL?

THAT RADIO
SPOKE TO ME!

HOW DID IT
KNOW MY NAME?

I KNEW I SHOULD
HAVE STAYED
HOME TODAY.



5. CIRCLING WINDS
INCREASE TO 74 MPH
OR MORE

6. IF HURRICANE REACHES
SHORE, LAND IS FLOODED
BY STORM SURGE



7. HURRICANE FADES
GRADUALLY AS IT
MOVES INLAND

THE FUTURE OF HURRICANES MORE, MORE, MORE?

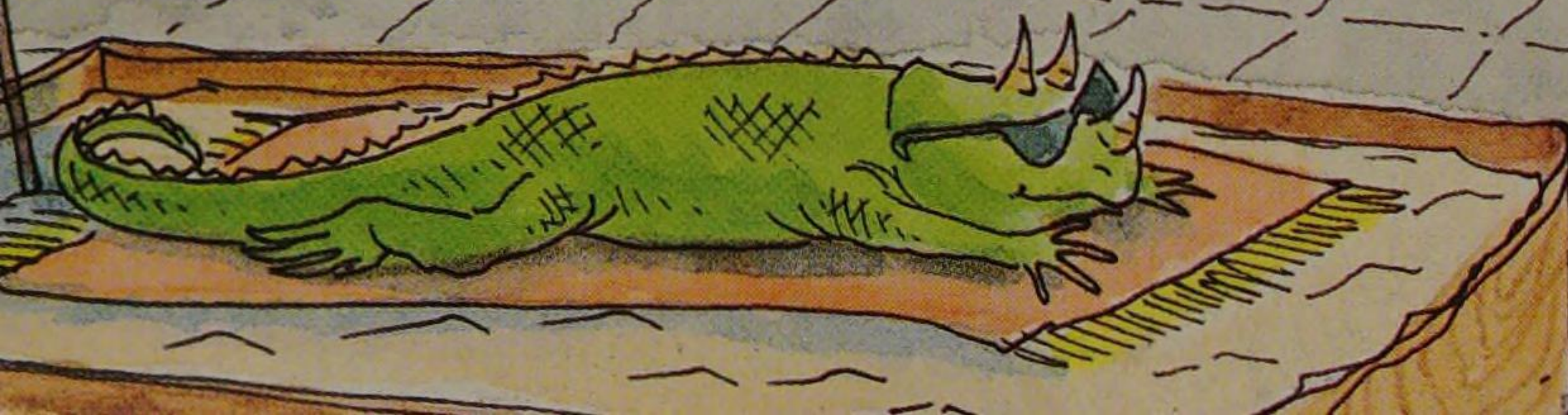
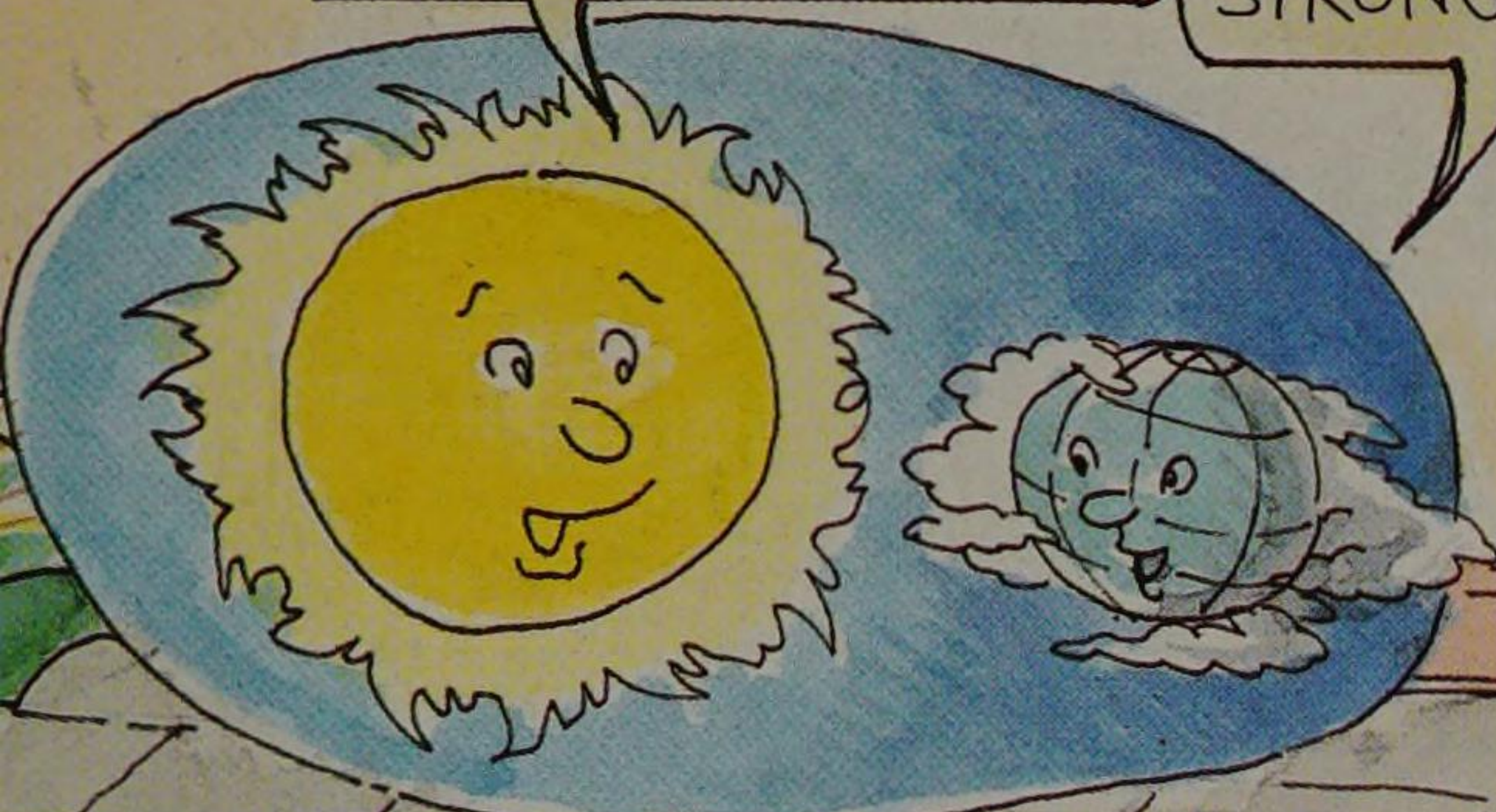
by Amanda Jane

During times when the earth is warmer, there may be more hurricanes.

- Many scientists think the earth's temperature is going up. If this is true, there could be more hurricanes in our future.

GLOBAL WARMING
COULD MEAN
MORE HURRICANES...

...AND THEY
MIGHT BE
STRONGER!



Finally, we drove back to school and finished up our weather projects.

THREE BAD THINGS HURRICANES DO by John

① Hurt people



② Destroy property



③ Make floods



THREE GOOD THINGS HURRICANES DO by Gregory

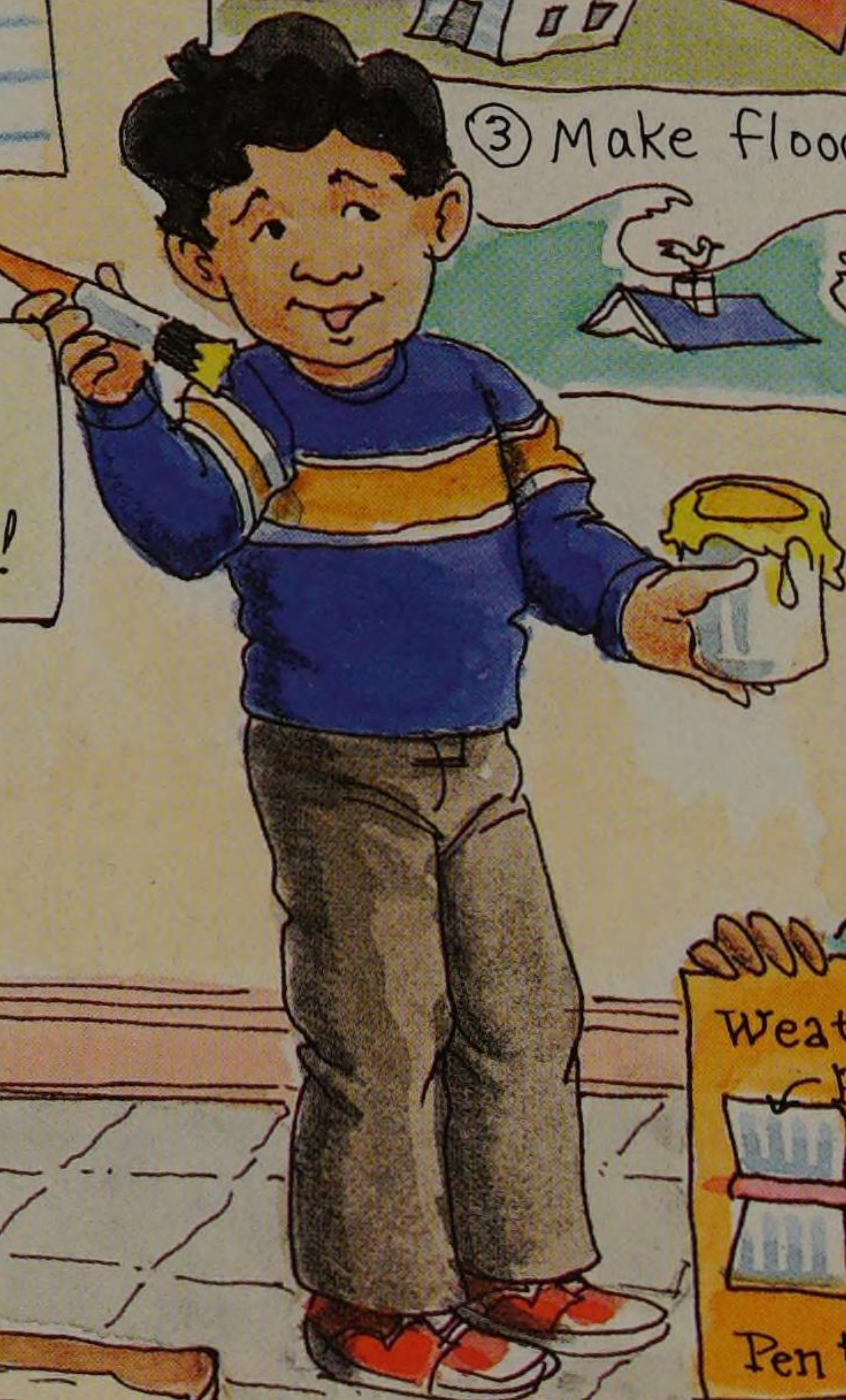
① Balance earth's temperature by drawing away hot air



② Bring rain to dry places



③ Clean the air with falling rain



Weather Vane



Rain Gauge

Put beaker out in rain.

How many inches fell?



by Amanda Jane

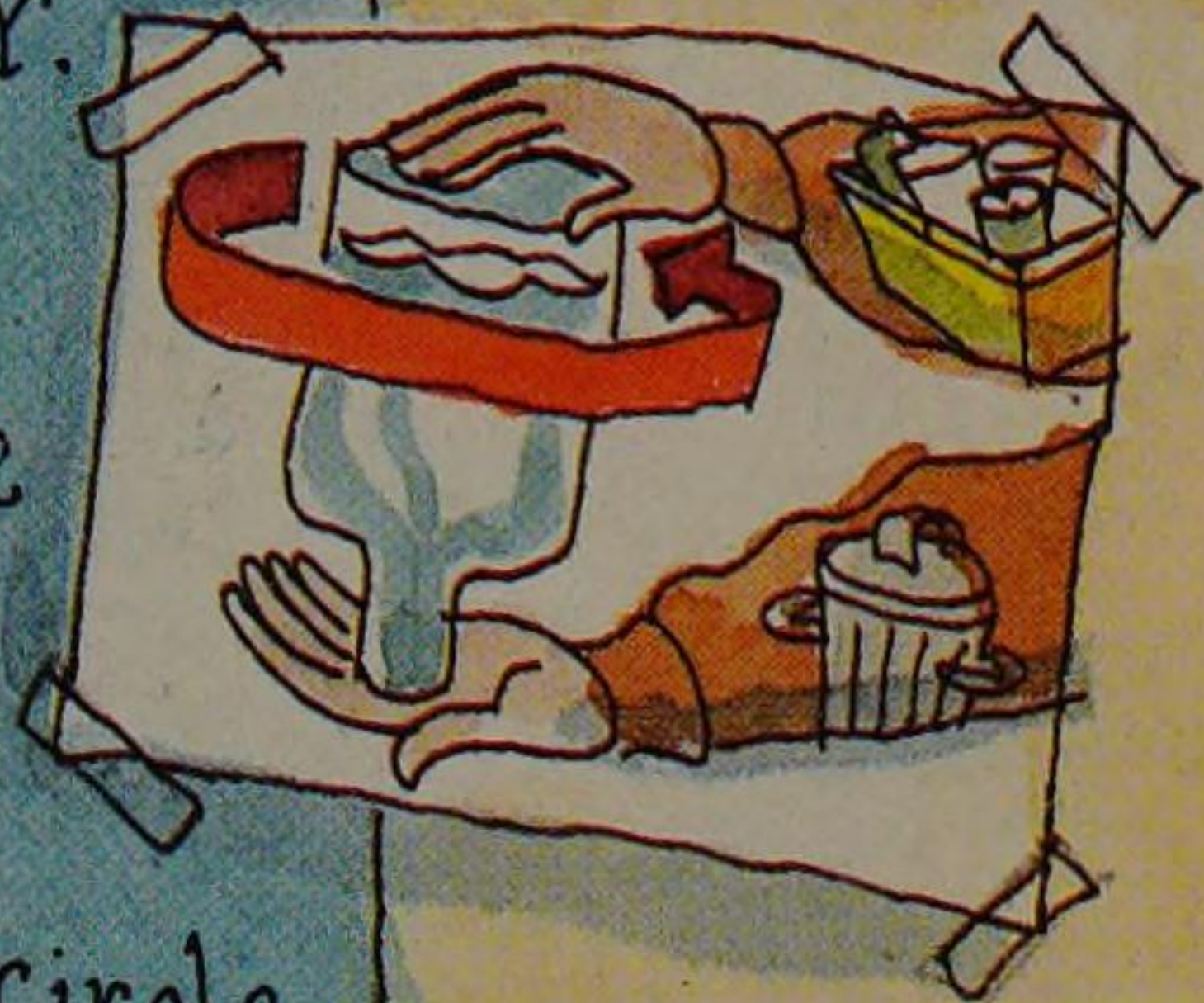
by Tim

Nail

MAKE A TWISTER IN A BOTTLE

by Ms. Frizzle

- ① Fill a bottle $\frac{2}{3}$ full of water.
- ② Hold bottle over sink.
- ③ Cover opening with one hand and turn bottle upside down.
- ④ Move bottle rapidly in a circle.
- ⑤ Stop circling.
Take hand away from opening.
- ⑥ See twister in bottle as water runs out.



I WANT TO FIND OUT MORE ABOUT...

How to keep safe
in hurricanes,
tornadoes, and
thunderstorms.
—Wanda



How snowflakes
form
—Ralphie



What causes
frost on
windowpanes?
—Rachel



What is Fog?
—Arnold



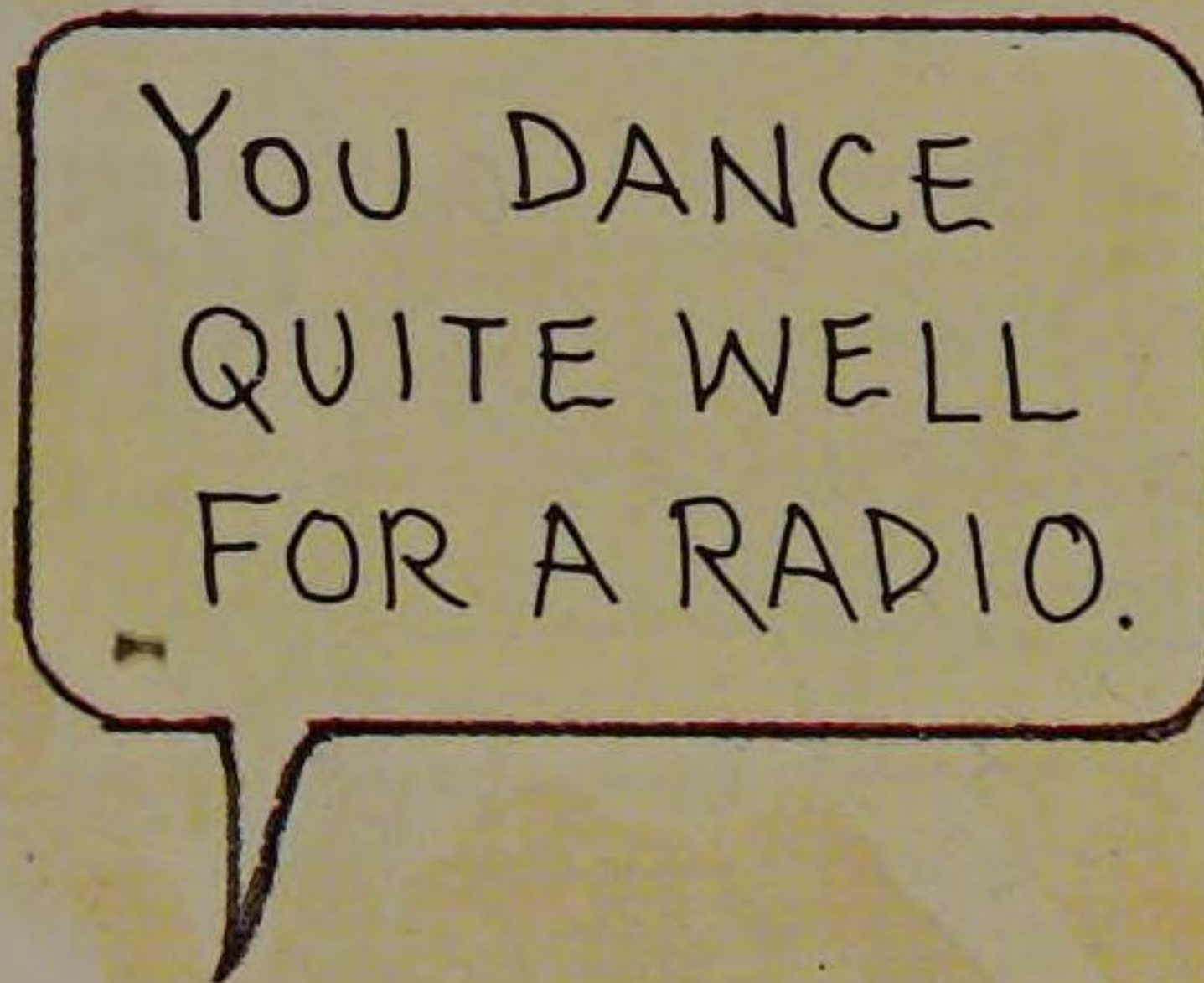
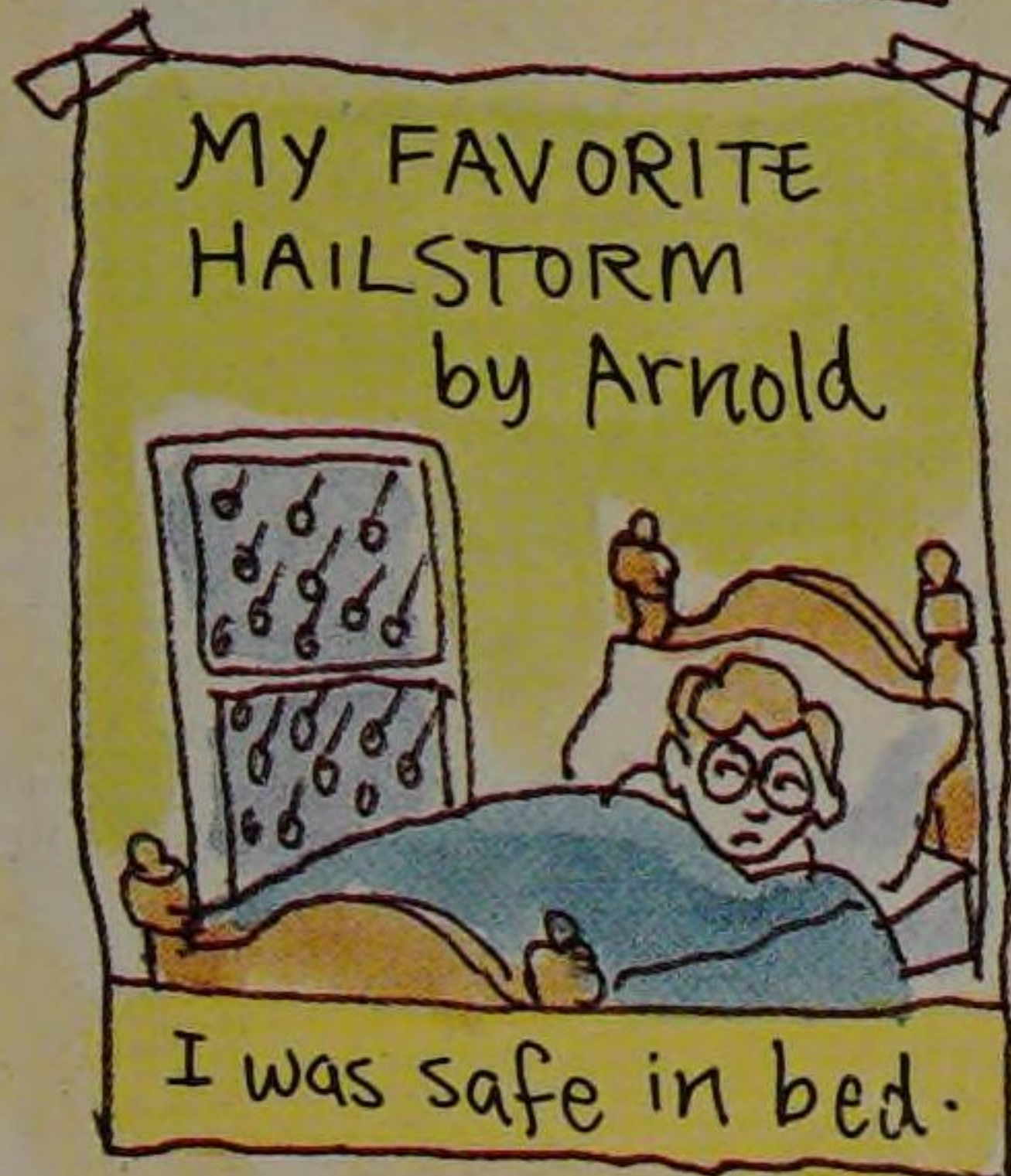
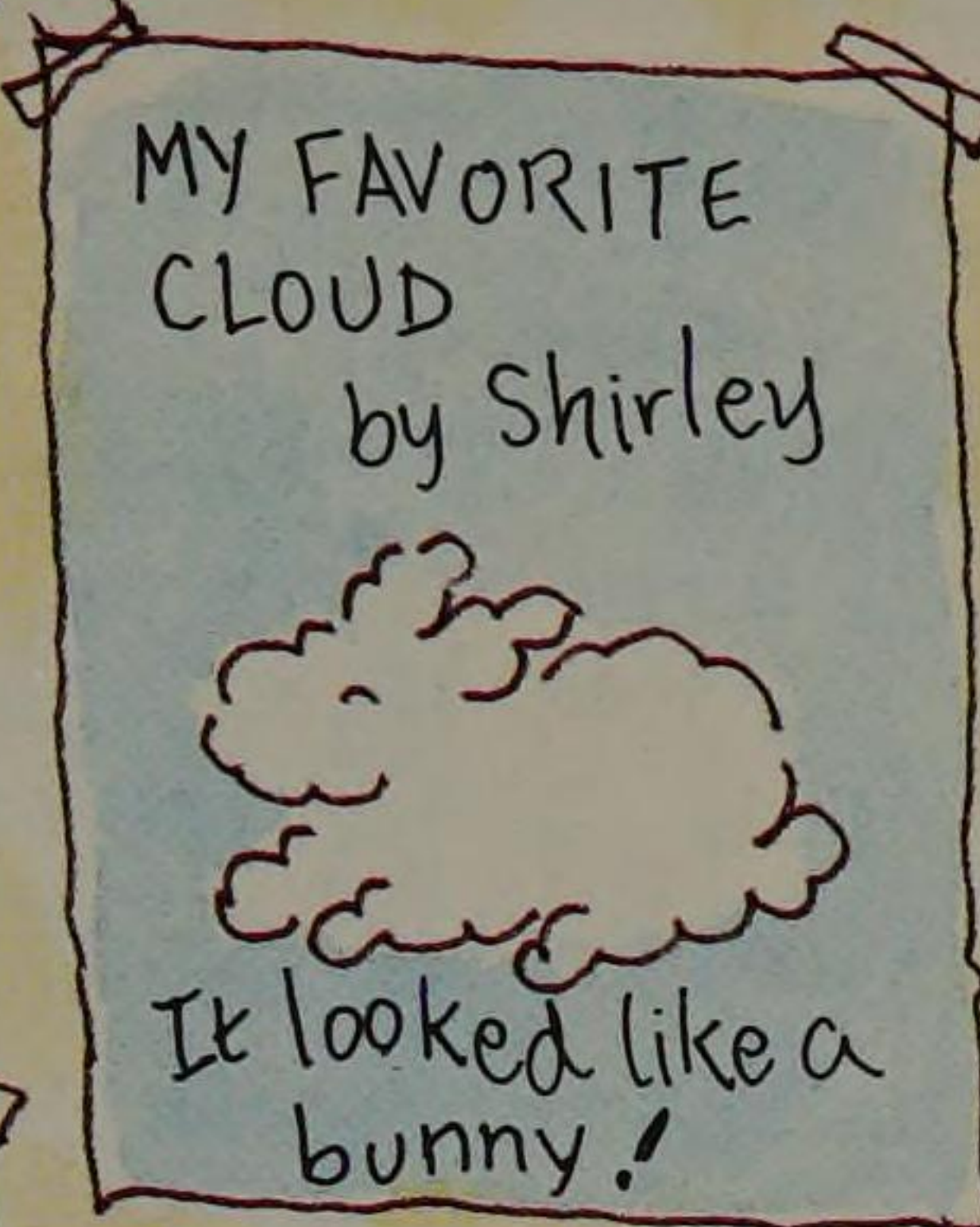
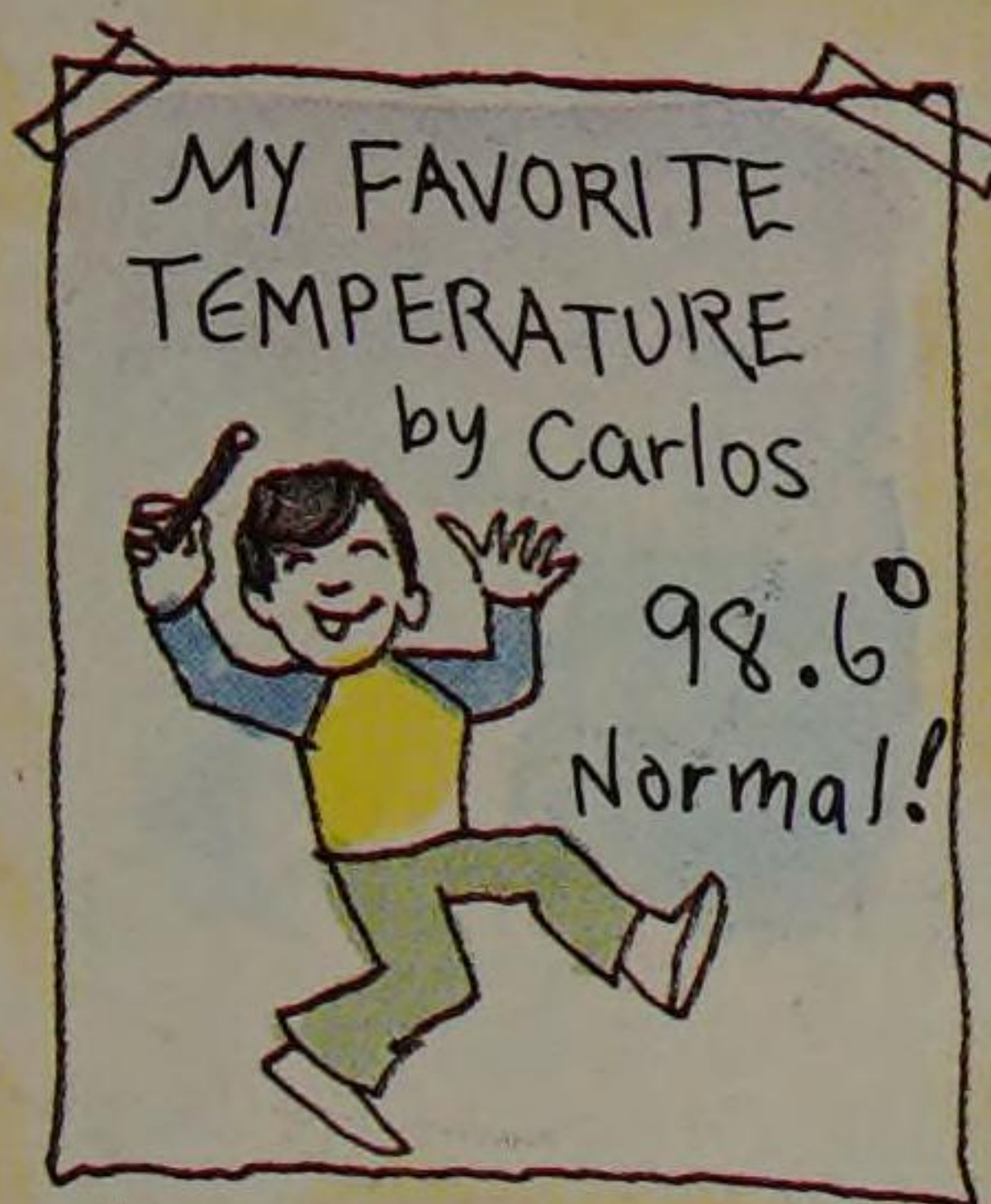
AND NOW FOR
SOME MUSIC....

WHAT? NO MORE
WEATHER?

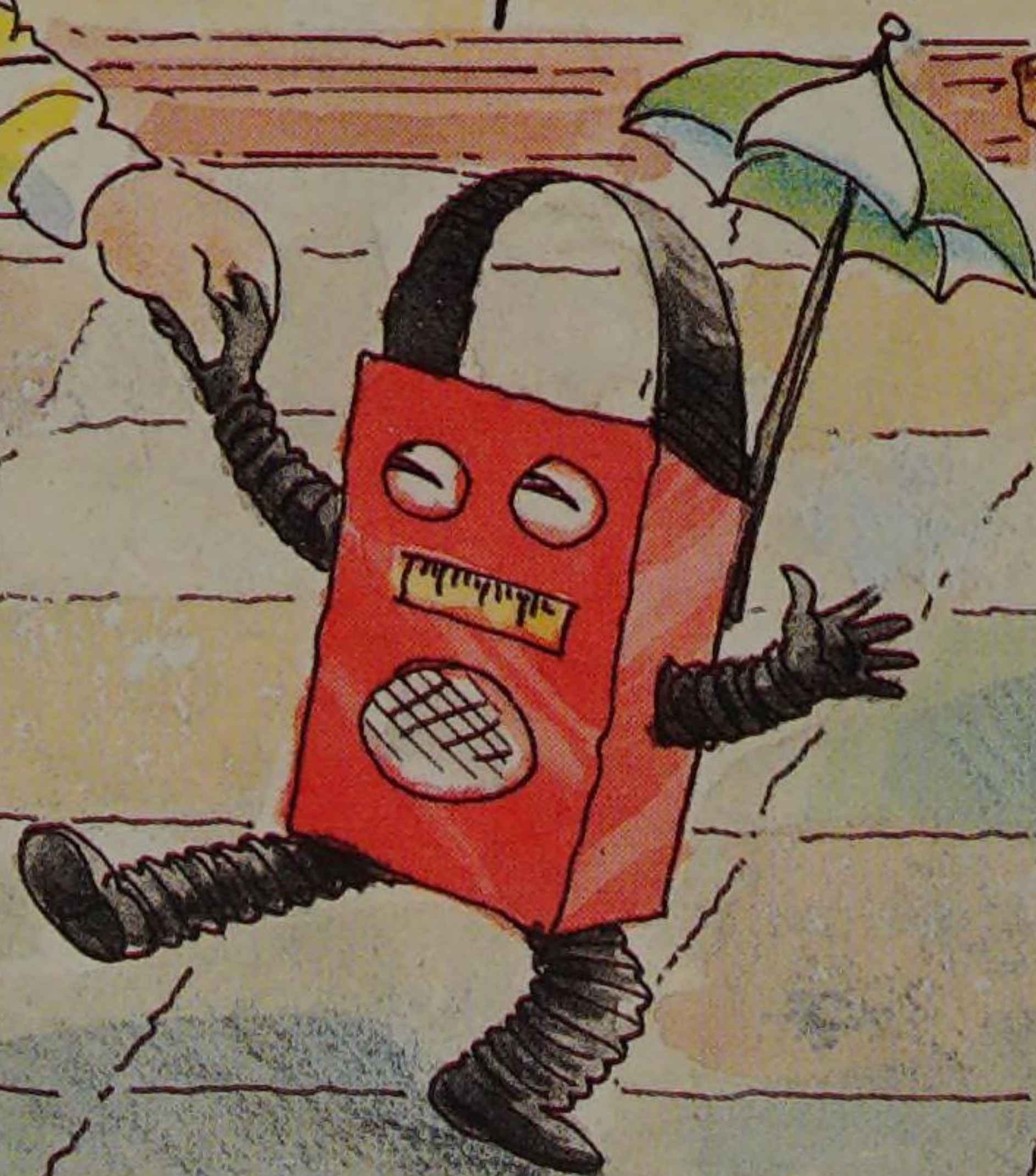
COOL!

ALL RIGHT!





After that trip, we needed some time to relax.
Ms. Frizzle said we could have a party.
We had great games, crazy dancing, and yummy snacks.
And for a while, we didn't even think about
Ms. Frizzle's next class trip!



In Asia,
a hurricane
is called a
typhoon.

WHAT'S BUZZIN',
COUSIN?

MS. FRITZLE'S
BUSY BEES

AT MY OLD SCHOOL
OUR TEACHER NEVER
WORE BEE SHOES!



The Magic School Bus Mail Bag

Letters... we get letters...



To the Magic School Bus Editor:
You should not have said
that a school bus could turn
into a hot air balloon or a
weather plane. That cannot
really happen. Your friend,
Sam

EXOTIC
BROOKLYN

FOR SALE

Dear Joanna,
Radios cannot
have conversations
with people.

Barbara

To: JOANNA COLE
AUTHOR
c/o Scholastic
Inc.

Dear Bruce,
Radios do not
dance.

from Jean

To: Bruce Degen
ARTIST
c/o Scholastic Inc.

Dear Arnold,
On your trip,
the hurricane
reached land. But
most hurricanes go far
out to sea and do not
hurt people and property.
Your friend,
Al, the weather scientist

Dear Joanna and Bruce,
Reading about hurricanes
may be fun, but it is no
fun to be in one!
I know because my
family was in Hurricane
ANDREW and it was
scary!

-Keith

A fishing boat
probably would not
survive if it were out
in a very strong
hurricane.

From the Coast Guard



Dear Bruce,

If Arnold really fell from
a great height into the
ocean, he would need medical
attention!

From your Doctor

Dear Joanna,
The things that happen on
Ms. Frizzle's trips are much
too risky for children.
Please keep them home
next time. Your Mother

Winter in
Connecticut

Dear Ms. Frizzle,
We think the whole class
should enroll in Phoebe's
old school.

—The students at the
Better-Safe-Than-Sorry
School

MOONLIGHT
IN BURBANK

To all readers:

Some of the things that happen
in this book are make-believe.
But of course, all the
Science is real!

Joanna & Bruce









Gene Russo



Hurricane Joanna traveled through the western Pacific in August 1968, and lasted for eight days. The real Joanna, author **JOANNA COLE**, lives in the northeastern United States. Ms. Cole is the recipient of the *Washington Post*/Children's Book Guild Nonfiction Award for the body of her work and the David McCord Literature Citation for her significant contribution to excellence in the field of children's books.

There has yet to be a Hurricane Bruce. However, illustrator **BRUCE DEGEN** captures the energy, intensity, and beauty of this unique weather system in intricately designed paintings that have become the signature of the Magic School Bus books. Mr. Degen has illustrated many, many books for children, including the popular Jesse Bear series and *Jamberry*, which he wrote and illustrated. He lives in Connecticut with his family.



SCHOLASTIC INC.

555 Broadway / New York, NY 10012

Ten million MAGIC SCHOOL BUS books in print!

Fasten your seatbelts as Ms. Frizzle and the Magic School Bus
take readers on the most amazing field trips ever.
Science has never been so much fun!

The Magic School Bus at the Waterworks
Boston Globe/Horn Book Honor Book for Nonfiction

The Magic School Bus Inside the Earth
A Reading Rainbow Feature Selection

The Magic School Bus Inside the Human Body
American Bookseller Pick of the Lists

The Magic School Bus Lost in the Solar System
American Bookseller Pick of the Lists

The Magic School Bus on the Ocean Floor
American Bookseller Pick of the Lists

The Magic School Bus in the Time of the Dinosaurs
American Bookseller Pick of the Lists

"... the freshest, most amusing approach to science for children!"
— The New York Times Book Review



51495

9 780590 446860

ISBN 0-590-44686-X